

US EPA RECORDS CENTER REGION 5



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HIMCO WASTE-AWAY SERVICES, INC. COMMENTS
TO UPDATE 7 OF THE NATIONAL PRIORITIES LIST

BARNES & THORNBURG

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Richard W. Paulen

December 14, 1988

Ms. Susan Swales (5HS-11)
Waste Management Division
U.S. EPA - Region V
230 South Dearborn Street
Chicago, IL 60604

RECEIVED
JAN 03 1989

Re: Himco Landfill Elkhart, Indiana

SUPERFUND PROGRAM
MANAGEMENT BRANCH

Dear Ms. Swales:

Pursuant to our telephone conversation of December 1, 1988, please find enclosed a copy of the Comments which were previously filed on behalf of Himco Waste-Away Services, Inc. with respect to the nomination of this Site to the NPL. If you have any questions which we may be able to answer regarding the comments which were filed please feel free to contact me.

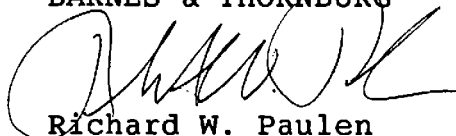
This will also confirm that we have received an extension of time to file responses to your 104(e) requests with respect to the following companies:

Experimental Nylon
Elkhart Foundary & Machine
Durakool, Inc. (Hermaseal)

Thank you for your consideration in this matter.

Respectfully,

BARNES & THORNBURG



Richard W. Paulen

RWP:ske

Enclosure

0818P

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TO UPDATE 7 OF THE NATIONAL PRIORITIES LIST

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August 17, 1988

Mr. Stephen Lingle, Director
Hazardous Site Evaluation Division
(Attention: NPL Staff)
Office of Emergency and Remedial Response
(WH-548A)
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Ms. Cathy K. Freeman
Region V
U.S. Environmental Protection Agency
5HR-11
230 South Dearborn Street
Chicago, IL 60604

Re: Comments of Himco Waste-Away Services, Inc.
on the National Priorities List, Update 7

Dear Mr. Lingle and Ms. Freeman:

This office represents Himco Waste-Away Services, Inc., an Indiana corporation. This letter and the accompanying enclosures will serve as Himco Waste-Away Services, Inc.'s comments concerning the proposed inclusion of the County Road 10 Landfill Site, or "Himco Dump Site" in Update 7 of the National Priorities List. (53 Fed.Reg 23988-23998) (June 24, 1988). The comments address three different issues, first the name of the site, secondly the specific information contained in the scoring package and finally, the presentation of additional information regarding the history of the site.

The first comment addresses the name of the site and constitutes a request by our clients to have the site redesignated as the County Road 10 Landfill Site. Our clients believe that this is not only a more accurate description but one which would treat our clients fairly and not impair their current ability to conduct their business in Elkhart County and the surrounding area. The comment itself sets forth the reasons for this request and we wish to reiterate at this point our request that the Environmental Protection Agency change the designation of this site.

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August 17, 1988
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Secondly, multiple comments regarding the information contained in the HRS Scoring Package and other information provided by Environmental Protection Agency Region V in response to our Freedom of Information Act Requests address specific issues and discrepancies which our clients believe exist in that information.

Finally, we have provided, in the form of a comment, what we believe is an accurate history of the site as a landfill. This information was compiled with the assistance of Mr. Charles H. Himes, Jr., the son of the former operator.

We would request that the information contained in these comments receive the consideration of the Environmental Protection Agency in its deliberations regarding what sites will be added to the National Priorities List. We believe that after consideration of the information we are providing, particularly the information found in those comments addressing the HRS Scoring Package directly, the Environmental Protection Agency will determine that this site should not be placed on the National Priorities List. These comments will point out numerous problems with the scoring of the site and identify a number of practical considerations which militate against inclusion of the site on the National Priorities List. The activities of Ecology & Environment, Inc., the Environmental Protection Agency's representative in the site investigation are highly suspect from a technical standpoint and we do not believe they would withstand the scrutiny of a close investigation by the Environmental Protection Agency. All of the information provided by the Environmental Protection Agency, the State of Indiana and the Elkhart County Health Department in response to requests for information and used in preparation of these comments, indicates that both the city water and well water used by residents in the area are free from any contaminants which might be emanating from the County Road 10 Landfill Site. This information indicates that the site does not currently represent a hazard to the community or even to the very limited number of residential home owners immediately adjacent to the Landfill.

In summary, we believe that the investigation and preparation of the scoring of this site was inadequate to justify inclusion of the site on the National Priorities List. The multiple inconsistencies in the Hazardous Ranking System package and related materials and the many unanswered questions should by themselves preclude the inclusion of this site. We

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believe that in light of the information in the Hazardous Ranking System package and that provided with our comments it is evident that the site does not represent the major threat depicted in the narratives relating to the site. The site does not represent an imminent or even threatened danger to anyone. All residents living immediately adjacent to the site now have deep wells which provide acceptable drinking water. The Elkhart City Waster Works can supply city drinking water to almost everyone who could possibly be affected by the potential for contamination from the County Road 10 Landfill site. The mechanics of the scoring model paint a picture which is a substantially worse picture than the facts reveal ever existed. The County Road 10 Landfill does not represent an immediate danger to any one and should not be included on the National Priorities List.

If after reviewing these comments, the Environmental Protection Agency still believes the County Road 10 Landfill should be on the National Priorities List we believe that it's score should be that calculated pursuant to the Hazardous Ranking System Worksheets found at Tab 19. This scoring most accurately reflects the information presented by the package, even in it's questionable form.

If any of the comments accompanying this letter raise questions about which we can provide additional information to the Environmental Protection Agency we would appreciate your contacting the undersigned who will obtain that information and do anything that is possible to facilitate the review of this matter by the Environmental Protection Agency. Thank you for including these comments in the appropriate dockets. We urge the Environmental Protection Agency to give them careful consideration and again, on that basis to determine that the County Road 10 Landfill Site should not be included on the National Priorities List.

Respectfully yours,

BARNES & THORNBURG

Richard W. Paulen

RWP:ske
Enclosures
cc: Himco Waste-Away Services, Inc.

INTRODUCTION TO COMMENTS

These comments are being submitted on behalf of HIMCO WASTE-AWAY SERVICES, INC., a party interested in the site designated as the "HIMCO, INC. DUMP, or HIMCO DUMP, Elkhart, Indiana", which is hereinafter referred to as the "County Road 10 Landfill" and nominated for inclusion on the seventh update of the National Priorities List. The comments address a number of issues including the Hazardous Ranking System Scoring Package, the Narrative Site Description, the name used for the designation of the site and other related matters.

HIMCO WASTE-AWAY SERVICES, INC., from the date of its incorporation on the 27th day of December 1968, was the primary hauler of wastes to the County Road 10 Landfill site. In that capacity the corporation and its employees became aware of many facts regarding the site which they believe are of significant importance to the proposal to include the site on the seventh update of the National Priorities List.

Wherever possible these comments will specifically address an identified area of the Hazardous Ranking System scoring sheets, the documentation records, reference documents and other relevant documents relating to the site. The comments will take a number of forms including the preparation of substitute documents for proposed inclusion in the Hazardous Ranking System Scoring Package where HIMCO WASTE-AWAY SERVICES, INC. believes it is appropriate.

These additional documents and other related items including Affidavits, are included and identified and referenced by Tab number in this binder. Any question regarding the comments should be directed to Mr. Richard W. Paulen, Esq., Barnes & Thornburg, 301 South Main Street, Suite 305, Elkhart, Indiana 46516 (219-293-0681), counsel for HIMCO.

0426P

COMMENT NUMBER ONE
REQUEST THAT DESIGNATION OF SITE BE CHANGED

This site is located in Elkhart County, Indiana. The site is composed of at least three separately owned tracts of real estate, see Tab 8. These tracts have had multiple ownership from the time the site was first used to the present. Tract A has been owned for a majority of the time of the operation by Miles Laboratories, Inc., and Tract B by CLD Corporation. An Affidavit of Mr. Ronald Taylor, an employee of the Elkhart County Abstract Company, Inc., a licensed title insurance company located in the County, setting forth the ownership of these Tracts, as well as the ownership of Tract C, from 1960, a period before the Landfill was first operated to the present, is located at Tab 9.

As can be seen from these records, no portion of the Landfill was ever owned by HIMCO WASTE-AWAY SERVICES, INC. That Corporation, in fact, did not come into existence until December 22, 1968, some eight years after the Landfill was first operated, see Tab 10. After it's incorporation HIMCO WASTE-AWAY SERVICES, INC. was a transporter of various solid wastes to the site, but did not at any time own or operate the site.

HIMCO WASTE-AWAY SERVICES, INC. is the only corporate entity doing business in the State of Indiana and utilizing any form of the name "HIMCO". While the Landfill was started and

operated by Mr. Charles H. Himes, Sr., one of the incorporators and an early shareholder of HIMCO WASTE-AWAY SERVICES, INC., the Corporation did no more than transport and deposit solid waste at the site.

HIMCO WASTE-AWAY SERVICES, INC. is currently one of several industrial/commercial solid waste transporters conducting business in Elkhart County, Indiana and surrounding areas. The Corporation has received several inquiries regarding the C.R. 10 Landfill site and HIMCO WASTE-AWAY SERVICES, INC.'s relationship to the site since the original publication of newspaper articles regarding the nomination of the site to the National Priorities List. These inquiries have come from both current and prospective customers, and have, the Corporation believes, severely and adversely impacted the Corporation's economic viability. The nomination has created publicity for the site which will continue and increase in the future. If that publicity continues using HIMCO WASTE-AWAY SERVICES, INC.'s name, or any derivative thereof, the effect on the Corporation will be not only unfair but grossly out of proportion to the Corporation's involvement at the site and potentially disastrous to the Corporation's business. HIMCO WASTE-AWAY SERVICES, INC. believes that it would be more appropriate to designate the site as the "C.R. 10 Landfill, Elkhart County, Indiana". This designation clearly identifies the site geographically as it is the only current or former

Landfill on C.R. 10 in Elkhart County. Further, this designation does not single out one interested party where there were multiple owners of the real estate, one of whom, Miles Laboratories, Inc., was the major generator of waste, contributing more than seventy percent of the total volume of the fill deposited. While HIMCO WASTE-AWAY SERVICES, INC., as the primary transporter of the authorized solid waste deposited at the County Road 10 Landfill, may have been one of the most visible parties involved, it was surely not the most significant participant nor the only participant involved with the site. HIMCO WASTE-AWAY SERVICES, INC. was never the operator or owner of the site and it did not generate any of the wastes landfilled at the site. To name the site on the N.P.L. or in other agency activities or correspondence using the "HIMCO" name would therefore not only be manifestly unfair, but would also be inaccurate, create a false impression of the significance HIMCO WASTE-AWAY SERVICES, INC.'s activities at this site, and would have an adverse and potentially devastating economic effect on the Corporation. HIMCO WASTE-AWAY SERVICES, INC. therefore requests that the Environmental Protection Agency change the designation of this site to the County Road 10 Landfill, Elkhart Indiana.

0404P

COMMENT NUMBER TWO

THE NARRATIVE

HIMCO WASTE-AWAY SERVICES, INC. believes that the narrative summaries prepared by both Ecology and Environmental, Inc. and the Environmental Protection Agency itself, see Tab 11, contain at least fourteen substantial and significant inaccuracies and should be revised. The inaccurate representations which HIMCO WASTE-AWAY SERVICES, INC. believes exist are as follows:

1. The name "HIMCO, INC. DUMP" or "HIMCO DUMP" are misleading and inaccurate. HIMCO WASTE-AWAY SERVICES, INC. has never done business under the name of HIMCO, INC. Additionally, an inquiry by their counsel with the Indiana Secretary of State's office indicates that no corporation has ever been incorporated with that exact name in the State of Indiana. Further, if the use of the "HIMCO" name is intended to represent the name HIMCO WASTE-AWAY SERVICES, INC., it would be inappropriate, as HIMCO WASTE-AWAY SERVICES, INC. never owned any portion of the Landfill site nor did it operate the site. In fact, various parts of the site in question were owned by a number of individuals and corporations during the operation of the site from 1960 to 1976. The site was operated by Chas. Himes & Sons, a sole-proprietorship operated by Mr. Charles H. Himes, Sr.

2. The site itself straddles the corporation limits of the City of Elkhart, with approximately 60% of the site inside the corporate limits of the City of Elkhart and 40% of the site in the unincorporated area of Elkhart County.

3. As the primary transporter of solid wastes to the site HIMCO WASTE-AWAY SERVICES, INC. is aware of what has been referred to as "Industrial Waste" having been hauled to the site. This industrial waste was categorized pursuant to the standards in common use at the time, as non-domestic and non-hazardous wastes and consisted primarily of paper and wood products.

4. HIMCO WASTE-AWAY SERVICES, INC. does not believe that any permit was ever issued by the City of Elkhart authorizing Chas. Himes & Son to accept municipal waste from Northwest Elkhart County. Northwest Elkhart County is outside the corporate limits of the City of Elkhart, and the City would have no jurisdictional authority with respect to that area of the County. Furthermore, as the Landfill was privately owned and operated, and at least partially outside the corporation limits of the City of Elkhart, the City would have had no basis for granting any kind of operational permit for the entire Landfill. In the early 1970's, the City of Elkhart did grant an operation permit for the portion of the Landfill inside the corporation limits.

5. The site was owned by a number of individuals and/or corporations during its period of operation and thereafter, see Affidavit of Mr. Ronald Taylor, at Tab 8. The owners of a small portion of the Landfill during the period of operation were Charles H. Himes, Sr. and Grace Himes, husband and wife. Neither Mr. Charles H. Himes, Jr. or HIMCO WASTE-AWAY SERVICES, INC. was ever an owner of any portion of the Landfill site.

6. The Landfill was operated by Chas. Himes & Sons, a sole proprietorship, conducted by Mr. Charles H. Himes, Sr.

7. The marshy area, rather than being excavated, was a low area which was filled to a maximum height approximately 12 to 15 feet above the surrounding dry ground grade level.

8. Industrial solid wastes, as defined at the time of operation of the Landfill as non-domestic, non-hazardous solid waste consisting primarily of paper and wood products, were transported to the Landfill site. The transporting company, HIMCO WASTE-AWAY SERVICES, INC. did not knowingly take in any hazardous wastes, as defined at the time, to the Landfill site for disposal.

9. Cobalt, selenium, beryllium, cadmium, copper, manganese and other metals were not only detected in monitoring wells downgradient from the site, but were also

detected in the upgradient wells, as indicated by samples ME3205 (Well E-2) downgradient and ME3201 (Well D-1) upgradient. As a result of these findings the downgradient well alone should not be singled out and consideration should be given to other possible sources in the area as the site of origination for the metals.

10. While the Landfill site is located over a continuous portion of the local outwash aquifer system that is, in its broadest sense, the sole source of drinking water for the community, that aquifer is a combination of multiple aquifers which in many areas of the community and surrounding county, are separated by dense and basically impermeable clay barriers. See U.S.G.S. Water-Resources Investigation 81-53, reference 3 of the Hazardous Ranking System Scoring Package HIMCO DUMP. The shallow aquifer in the area of the site, both up and downgradient, has demonstrated the presence of numerous metals. The deeper aquifer has provided well water of acceptable quality as demonstrated by the test results of the Indiana Department of Health on water samples taken from deep wells at residential homesites adjacent to the Landfill. See the summary in the letter from Mr. W. T. Paynter, M.D. State Health Commissioner to the Hon. O. R. Bowen, Governor State of Indiana, dated April 5, 1977, reference 17 of the Hazardous Ranking System Scoring Package HIMCO DUMP.

11. It is doubtful that 200, let alone 20,000 people may be effected by drinking water which may be contaminated by the site. Almost the entire area in the path of and adjacent to the suggested plume of contamination as projected by the U.S.G.S. have city water available. According to Mr. Michael Terlep, manager of the Elkhart City Water Department, the City's water is not effected by the site, see Tab 12. The single family residences along County Road 10 and a small area Southeast of Bristol Street to the Southeast of the site are the only potentially affected areas which do not have city water available, and include less than 30 single family residences. These residences, as indicated above, are currently being serviced by acceptable water from deep wells, or have no known problems with their shallow wells. While the statement, that from ten to twenty thousand people are served by city water within 3 miles of the site is correct, no basis currently exists for stating that anyone's drinking water is adversely affected by the site, nor that any will be in the future.

12. While HIMCO WASTE-AWAY SERVICES, INC. did have deep wells drilled for six property owners on County Road 10 who had contaminated shallow wells, that action was taken by the Corporation voluntarily and of it's own accord, not in response to any direction from the Indiana State Health Commission or any other state or local governmental agency.

Drilling the deep wells in order to obtain clean drinking water was taken as the quickest, most economical solution to a potential problem, and was not an admission of any liability or wrongdoing by HIMCO WASTE-AWAY SERVICES, INC.

13. While leachate streams and stressed vegetation may have been visible at the time of a site inspection in 1984, some 8 years after closure was completed, the inspections of the Division of Sanitary Engineering, Indiana State Board of Health, immediately prior to closing and at the time of closing, as shown by the reports located at Tab 13, showed the site to be a good operation. The site was, in fact, modeled after and run pursuant to the requirements of the U.S. Department of Health, Education and Welfare, Public Health Service Publication No. 1012, 1963, see Tab 14, and the Affidavit of Charles H. Himes, Jr., see Tab 15.

14. While the U.S.G.S. did conduct a hydrogeologic study of the area in 1980, that study, as it relates to the County Road 10 Landfill site, did not influence in any way the installation of two interceptor wells used to divert contaminated ground water away from the North Main Street wellfield. These interceptor wells and their related air strippers are located along Main Street on the East side of the wellfield. The County Road 10 site is approximately one and one-half miles to the Northwest of the Mainstreet wellfield. Additionally, the treatment of the intercepted

water, air stripping, is designed to remove volatile organic compounds from the water, not heavy metals. These interceptor wells and the air strippers were installed in response to a plume of contamination, primarily TCE, originating to the East of the wellfield and completely independent of the County Road 10 site, see Mr. Terlep's Affidavit at Tab 12 and the excerpt from the CDM Bid Package from the Main Street Wellfield work - Spring of 1988, see Tab 16. The interceptor wells, therefore, would only intercept any potential contamination from the County Road 10 site after it had traversed the wellfield. All references to these wells should therefore be stricken from the narrative as completely irrelevant, totally misleading, and of no value to the site evaluation.

A proposed form of narrative summary, which we believe more accurately and fairly reflects the history of the site follows this comment. The proposed form of narrative addresses the relevant issues of the United States Environmental Protection Agency's narrative in a more accurate manner. We believe this revised narrative should accompany the Hazardous Ranking System Scoring Package.

PROPOSED NARRATIVE SUMMARY
COUNTY ROAD 10 LANDFILL
ELKHART, INDIANA

The C.R. 10 Landfill site covers approximately 40 acres at the Northwest corner of the intersection of County Road 10 and the Nappanee Street Extension, in Elkhart County, Indiana. The site is currently located partially within the corporate limits of the City of Elkhart, and partially in the unincorporated area of Elkhart County. The privately owned site was operated between 1960, and September, 1976, by Mr. Charles Himes, Sr.. Portions of the area were excavated to a depth of 10 feet and together with a marshy area were filled with general refuse and medical and pharmaceutical wastes. Industrial solid wastes, (non-domestic, non-hazardous solid wastes primarily consisting of paper and wood products) may also have been deposited, according to the transporter and a report prepared by the Indiana Department of Natural Resources and the Elkhart Water Works.

The total amount of any hazardous wastes landfilled at the site is unknown. Representatives of the Environmental Protection Agency detected cobalt, selenium, beryllium, cadmium, copper, manganese and other metals in monitoring wells in the area. These results corroborated an analysis of residential shallow wells conducted in 1974, by the State, which showed high manganese levels.

The site is located above a continuous portion of the shallow, or upper, aquifer system that together with the lower, or deep, aquifer serves as the sole source of drinking water for the community. While shallow wells at some residences in the immediate area may be effected, almost the entire population of the City as well as many outlying areas have service available from the municipally owned Elkhart City Water System which remains unaffected by the site.

In response to a suggestion of the Indiana State Health Commissioner, Himco Waste-Away Services, Inc., the primary transporter of solid waste to the site voluntarily drilled deep wells to replace six contaminated shallow residential wells in the immediate areas of the site in 1974. These deep wells remedied the contamination problem for the residents in the immediate areas who are not on the City Water System.

In 1975, Himco Waste-Away Services, Inc. entered into a Consent Agreement (adopted by the Indiana Stream Pollution Control Board) that resulted in the closing of the site in September, 1976. As part of the closure proceedings and in accordance with the Consent Agreement virtually all of the site was covered with a layer of calcium sulfate approximately 24 inches deep, and much of the site was then covered with sandy top soil and seeded. During a site inspection the Environmental Protection Agency representatives observed

several streams of leachate and isolated spots of stressed vegetation. The maximum height of the landfill was about 15 feet above the original ground level at the center of the site and sloped to 5 feet at the edges of the landfill.

0425P

COMMENT NO. THREE

THE HAZARDOUS RANKING SYSTEM
SCORING SHEETS AND DOCUMENTATION PACKAGE

HIMCO WASTE-AWAY SERVICES, INC. believes that the Hazardous Ranking System Work Sheets and accompanying Documentation Records are inaccurate and were improperly completed. Specifically the Ground Water Route Work Sheet is in error.

The ground water route for the County Road 10 Landfill site is based on analytical results of samples collected by the Environmental Protection Agency Region V FIT contractor on July 30, 1984. These results have been utilized to justify the inclusion of an observed release to ground water as part of the ground water migration route score. Careful inspection of the data provided can lead only to the conclusion that these sample results do not justify a finding of an observed release to ground water as indicated in the record of documentation.

The data and rationale presented in the original Hazardous Ranking System package are based on the presence of cobalt, arsenic, barium and selenium in the shallow down gradient monitoring well E-2 (Sample ME 3205) as compared to the upgradient monitoring well D-1 (Sample ME 3201). The lack of information in the scoring package regarding the acquisition of the samples and the analytical procedures employed in testing the samples as well as the interpretation of the well

data by the Environmental Protection Agency and it's representatives create significant questions regarding the validity of the conclusions drawn and the Hazardous Ranking System score calculations.

HIMCO WASTE-AWAY SERVICES, INC., through it's counsel, attempted to obtain relevant quality assurance and control data from both Ecology and Environmental, Inc., the United States Environmental Protection Agency Region V FIT contractor performing the work on this project, and the Environmental Protection Agency. The representative of Ecology and Environmental, Inc. contacted, indicated that information, if it in fact existed, could only be made available with the consent and at the direction of the Environmental Protection Agency. After a number of contacts with the Environmental Protection Agency, Region V, HIMCO WASTE-AWAY SERVICES, INC.'s counsel was informed that the Environmental Protection Agency was not required to provide the requested information and that it would not provide the information in response to a request made on behalf of HIMCO WASTE-AWAY SERVICES, INC. under The Freedom of Information Act, (See Tab 17). Because the scoring package and related documents made available to HIMCO WASTE-AWAY SERVICES, INC.'s counsel by the Environmental Protection Agency did not have the information which could have answered questions raised by the experts employed to review the scoring package, these comments are based solely on the information made available and assume that no other quality assurance or control data exists.

According to one of the scientific consultants, the Mittlehauser Corporation, the collection of the underground samples was not properly or thoroughly documented according to good scientific data collection standards. No data was included in any of the materials provided by the Environmental Protection Agency regarding well design, construction, integrity assessment or security measures. The two wells, E-2 and D-1 utilized by the Environmental Protection Agency, are both shallow wells, 17' and 19' deep respectively. These wells are two inch PVC wells with non-locking threaded screw-on caps. In each case the wells are not secured and are, in their present configuration, incapable of being secured. Additionally, in each case the screw caps contained vent holes open to the environment.

The Hazardous Ranking System scoring package data and information provide no background data on water level readings, or any other information on how or if the water level was determined. Neither does the material provide any information regarding whether or not the shallow wells were grouted in an effort to maintain their integrity. The consultants indicate that all of this information as well as proper installation of the wells is essential if the test results are to be used.

Finally the fact that no information is contained in the scoring package or related materials regarding the sampling procedures, the equipment used, the filtration and preservation

of samples and the volume of water removed prior to sampling make the results suspect. Only a small scale diagram of the well locations is included in the scoring package. Actual inspection of the wells by HIMCO WASTE-AWAY SERVICES, INC. and their counsel shows that the D wells are located adjacent to a drainage swale on the West side of the Nappanee Street Extension approximately 0.4 miles North of County Road 10. The E wells are on the North side of County Road 10 just to the West of the Nappanee Street Extension. The P well is at the corner of County Road 10 and the Nappanee Street Extension and is in fact below grade level, being covered with a water meter type service cover. These locations and well heads are all subject to contamination and run-off from the adjacent highways. During wet or winter weather that run-off will carry the residue of road de-icers and automotive and heavy commercial traffic.

According to Environmental Protection Agency Region V and Mitre Corporation guidance on the interpretation of analytical data, a usable data "hit" from a downgradient well sample must fit one of two profiles. In the first situation the downgradient parameter must be present at a level at least three times (3X) the detection limit if the parameter is undetected in the upgradient sample. In the second situation, where a parameter has been detected in both the up and downgradient wells the value in the downgradient well sample

must be at least ten times (10X) greater than that of the upgradient sample. Of the inorganic compounds utilized in the record of documentation (cobalt, barium, arsenic and cadmium) to support the observed release to ground water, cobalt, does not qualify since it was not detected in the sample from well D-1, the upgradient well, and it is not 3X greater than the detection limit in the downgradient sample at well E-2. Barium and arsenic will not satisfy the guidance standards since the values reported for the downgradient well E-2, are not 10X greater than the values reported for the upgradient well, D-1. Only cadmium may qualify as a usable data value for an observed release from the initial inspection. The validity or usability of the cadmium data, is, however, highly suspect and should not be used to support an observed release.

The analysis for cadmium shows a detection limit by the furnace method of 1 ug/l at the upgradient well, D-1, sample ME 3201. The downgradient sample from well E-2, sample 3205, indicates the presence of 10 ug/l of cadmium using the plasma method. This amount represents the absolute minimum 10X increase required for a usable "hit". The use of two different analytical methods, with admittedly different sensitivities, does not, however, provide the kind of definitive data required where a single "hit", on the bubble of acceptability, serves as the only basis for an observed release. The fact that different analytical methods were used should in and of itself

preclude this data where such small concentrations are being studied. When this problem is combined with the lack of additional sample collection and handling information, the question of the reliability of this data becomes even more evident.

There are a number of other factors which were not taken into consideration in the preparation and interpretation of the data in the Hazardous Ranking System scoring package. One such factor is the high level of many inorganic constituents in the upgradient well, D-1, the lack of those same characteristics in two on site shallow wells, P (Sample ME 3202) and M (Sample ME 3203) and the re-appearance of those same characteristics in the downgradient well E-2. Both the upgradient well, D-1, and the downgradient well, E-2, are shallow wells that are located immediately adjacent to public roadways and are potentially subject to road surface run-off and infiltration. It is very possible that activities associated with the roadways, such as salting and surface washing, could effect the quality of the shallow ground water system or invade the well systems themselves if their structural integrity is not intact. The fact that many of these inorganic parameters are lower on site away from the roads, than at the upgradient and downgradient wells, which are located near the roads, raises additional question that should preclude the use of the selected data to establish an observed

release. Additionally, there is some indication in the Hazardous Ranking System Scoring Package reference documents and HIMCO WASTE-AWAY SERVICES, INC. is aware of sludge farming in the area of the Elkhart Municipal Airport. The sludge deposited was generated at the City of Elkhart's Waste Water Treatment Plant and could be a source of the constituents detected in both the upgradient and downgradient wells.

Based on the foregoing HIMCO WASTE-AWAY SERVICES, INC. believes that it is evident that the observed release criteria should not be used in scoring the site. It would be substantially more accurate to consider the site for scoring using the route characteristic criteria. HIMCO WASTE-AWAY SERVICES, INC. has prepared two alternative scoring sheets for the site which are at Tab 18 and Tab 19.

The difference between these two alternatives is found at section 5 of the Ground Water Route Worksheet (Targets). While at least a portion of the site is located over an unconfined aquifer, that aquifer consists of more than one water system. As indicated in reference 17 to the Hazardous Ranking System scoring package each of the homes adjacent to the South side of the Landfill has a new well 152 or more feet deep through a clay barrier which should isolate the aquifer from any problem at the site. If these wells, the closest of which is approximately 200' from the edge of the site, are used as the closest wells drawing from the aquifer of concern, Tab

18 would represent the new score. If on the other hand, these wells are not considered to be drawing from the "aquifer of concern" the closest well drawing from that aquifer would be between one and two miles away and would result in a score depicted in Tab 19.

HIMCO WASTE-AWAY SERVICES, INC. believes that the Hazardous Ranking System scoring package depicted in Tab 19 would be most representative of the site. The deep well water samples from the upgradient well D-2 (Sample ME 2487 174' deep) and the downgradient well E-3 (Sample ME 3204, 174' deep) are virtually identical in their characteristics and represent uncontaminated background level drinking water. Water from this same aquifer is available to the property owners to the South of the Landfill and along the only portion of Bristol Street not serviced by the City. Additionally, all of these areas could be serviced by city water, as indicated by the Affidavit of Mr. Michael Terlep, Tab 12.

COMMENT NUMBER FOUR

SPECIFIC COMMENTS (NON-TECHNICAL) ON SCORING PACKAGE COVER SHEET AND REFERENCES

The following are specific comments regarding identified documents or portions thereof in the Hazardous Ranking System Scoring Package, Hazardous Ranking System Coversheet and Worksheets, Documentation Records, and Hazardous Ranking System Documentation Log Sheet and related references not otherwise addressed by HIMCO WASTE-AWAY SERVICES, INC.:

1. Figure 1 - Hazardous Ranking System Coversheet. This Landfill was never operated by HIMCO WASTE-AWAY SERVICES, INC. and should not be designated the "Himco Dump". Mr. Charles H. Himes, Sr., a sole-proprietor conducted the Landfill business as Chas. Himes & Sons. Charles H. Himes, Sr. was not President of HIMCO WASTE-AWAY SERVICES, INC. at the time of the site inspection in 1984. (This comment is applicable to all of the references using the name "HIMCO" or "Himco Dump".)

2. Documentation Records. (a) p.2A HIMCO WASTE-AWAY SERVICES, INC. never knowingly transported to nor did Chas. H. Himes & Sons knowingly accept any hazardous wastes for disposal on the site. (b) p.5 The Gross residence is no longer in existence and the well on that property no longer used. Further, it is highly unlikely that there are 44,495.4 people served by the ground water within a three (3) mile area

of the site. The Indiana State Board of Health, in completing a Potential Hazardous Waste Site Preliminary Assessment (Environmental Protection Agency Form 2070-12(7-81)) in February of 1984 estimated the population potentially effected at 15,900+, see Tab 20. (c) p.7 The Mr. Himes referenced to here is Mr. Charles H. Himes, Jr., who, as an employee of HIMCO WASTE-AWAY SERVICES, INC., transported materials to the site. Mr. Himes, Jr. never owned or operated the site. Additionally the "Lugger" containers used to transport materials to the Landfill were not conducive to carrying liquids and would have lost most liquids before arriving at the site if a customer had concealed them in wastes. (d) p.7A A continuing visual review of the site fails to demonstrate leachate accumulating throughout the site. The site was covered with approximately 2 feet of calcium sulfate before top soil was added and seeded. Areas do exist where the calcium sulfate has come to the surface as a result of the wind and water erosion, but these areas, as well as numerous anthills and small animal burrows that display the presence of calcium sulfate do not constitute leachate in either the common or technical sense, and these areas would be expected where calcium sulfate was used as part of the approved cover for the site. The methane and hydrogen sulfide or sulfate gas noticed on the site are common in swampy areas and are not indicative of any particular problem on the site.

3. Reference Number 3. (a) p.2 This page indicates that all chemical constituents were attenuated within approximately one mile downgradient from the site. Before this site is included on the National Priorities List, this should again be confirmed. This page also refers to ground water quality degradation due to liquid and solid waste disposal practices in some areas of Elkhart County. This reference does not specifically include the County Road 10 Landfill site and should not be so interpreted. (b) p.3 All references to a "Himco Landfill" should be deleted as HIMCO WASTE-AWAY SERVICES, INC., was never the owner or operator of a landfill in Elkhart County, Indiana. (c) p.5 The site was in fact closed in 1976, and only calcium sulfate and top soil and seed were deposited in 1977 on the site.

4. Reference Number 4. Reference to the "Himco Dump" should be deleted for the reasons stated above. Additionally it should be noted that no sludge from any source, including the City of Elkhart's waste water treatment plant was ever accepted at the County Road 10 Landfill site and any reference to a sludge farm should be deleted. The interceptor wells at the North Main Street wellfield were not installed by the Environmental Protection Agency, but by the City of Elkhart. The United States Environmental Protection Agency did participate in the installation of two air strippers used in conjunction with the wells. This system was not installed in

response to any threat posed by the County Road 10 Landfill site and would be of no effect, due to it's location, with respect to that site. The treated water from the interceptor wells and air strippers is currently being placed directly in the city water supply and not into Christiana Creek.

5. Reference Number 7. The Gross house is no longer in existence, the map is inaccurate, and any reference to this property in the context of the site evaluation and Hazardous Ranking System scoring is both inaccurate and inappropriate.

6. Reference Number 8. (a) p.1 All references to HIMCO Dump should be deleted for the reasons stated above. The site representative present was Mr. Charles H. Himes, Jr., the President of HIMCO WASTE-AWAY SERVICES, INC., the primary transporter of materials to the site. (b) p.3 All references to an affected population of 42,000 are inaccurate and unsupported. The Elkhart River terminates approximately two miles to the East of this site and should not be a factor considered in the surface water contamination. No surface or ground water flow data in any of the information in the Environmental Protection Agency file on this site indicates any connection between the site and the Elkhart River. (c) p.6 The redrilled residential wells were drilled by HIMCO WASTE-AWAY SERVICES, INC. on behalf of Charles H. Himes, Sr., and not by or on behalf of Charles H. Himes, Jr. (d) p.9

Neither Charles H. Himes, Jr. nor HIMCO WASTE-AWAY SERVICES, INC. ever owned any of the property where the County Road 10 Landfill was located. (e) p.10 There is no Indiana corporation by the name of HIMCO, INC. HIMCO WASTE-AWAY SERVICES, INC. never operated the County Road 10 Landfill site, it did, however, transport materials to the site. Mr. Charles H. Himes, Jr. has been a shareholder of HIMCO WASTE-AWAY SERVICES, INC. from December, 1970, to the present.

7. Reference Number 9. While sand and top soil were used as final cover there was an additional cover below the sand or top soil and above any waste of at least two feet of calcium sulfate. This method of covering the waste was used with the approval by the appropriate authorities of the State of Indiana. From it's incorporation in 1968, to the closure of the Landfill in 1976, HIMCO WASTE-AWAY SERVICES, INC. was the primary transporter of the authorized solid waste to the site. HIMCO WASTE-AWAY SERVICES, INC. was never known as Earthmovers, Inc. Earthmovers, Inc. was an Indiana corporation incorporated in 1975, for the purpose of opening and operating a new landfill after the State had determined that the County Road 10 Landfill site should be closed, see Tab 21. Any visible waste at the site was deposited either by owners of the site after closure in 1976, or was unauthorized. At the time the site was closed there was no visible waste.

8. Reference Number 14. Again reference to any waste water treatment or sludge farming should be deleted from this reference. No liquid wastes were deposited on the site and no sludge from any waste water treatment facility was ever accepted. The closest known sludge farm was located at the Elkhart Municipal Airport.

9. Reference Number 16. The comments made in numbered paragraph 8 above are again applicable to the caption of this reference document.

10. Reference Number 17. The Charles Himes identified in numbered paragraphs 5 and 8 of this letter is Charles H. Himes, Sr., an owner of a portion of the site and the sole proprietor of Chas. Himes & Sons, the operator of the County Road 10 Landfill site.

11. Reference Number 18. HIMCO WASTE-AWAY SERVICES, INC. believes that references to the Dunlap area, and the significant area South of the corporate limits of the City of Elkhart should be disregarded with respect to this site. The only city wellfield even remotely threatened by any possible contamination from the site would be the Bower Street wellfield which has only one well which is regularly used. The other wells at the Bower Street site are not used unless absolutely necessary due to high iron content, the same problem found in all the shallow wells, both up and down gradient, monitored in the investigation of the County Road 10 Landfill site.

0430P

COMMENT NO. FIVE

SITE HISTORY

HIMCO WASTE-AWAY SERVICES, INC. believes that there are a number of historical inaccuracies regarding the County Road 10 Landfill site in Elkhart County. Because of these inaccuracies it wishes to make the following comment regarding the history of this site.

The County Road 10 Landfill was opened in approximately 1960 by Mr. Charles H. Himes, Sr., a sole-proprietor who had been conducting business under the names Chas. Himes & Sons and Himes Cartage for a number of years. The primary client of Chas. Himes & Sons was Miles Laboratories, Inc., a local pharmaceutical company. In approximately 1968, Mr. Himes, Sr. purchased Days Waste-Away and a small number of additional local trash routes. In 1968, HIMCO WASTE-AWAY SERVICES, INC. was incorporated. This Corporation tookover the trash hauling and pick up business of Himes Cartage and Chas. Himes & Sons. Mr. Himes, Sr., through Chas. Himes & Sons continued to run the Landfill. Himes Cartage continued it's regular freight business until approximately 1972 when it ceased all operations.

Chas. Himes & Sons conducted it's business independently of HIMCO WASTE-AWAY SERVICES, INC. and controlled the activities of the Landfill. It maintained it's own equipment, accounts, and advertisements, paid it's employees,

charged HIMCO WASTE-AWAY SERVICES, INC. for dumping and filed it's own income tax returns as a sole proprietorship. It's activities were separate and distinct from the hauling business, and it also conducted a fiber drum, cardboard carton and shipping container business.

It is believed that Charles H. Himes, Sr. selected the County Road 10 Landfill site in response to the standard landfill practice of the time, (see Tab 14) filling swamps and low lands. This practice was believed to be of common benefit to land owners and the community. Portions of the Landfill site were used from time to time for gravel and other commercial operations. The area was low enough that it was not usable as farm land. Available top soil was stripped and stockpiled, excavations were dug on dry land and filled and the low lying marsh or swamp was simply filled. Fill was reduced, compacted and covered on a regular basis. At the request of a Lessee of the owners of the gravel pit, Charles H. Himes, Sr. built a road bed of compacted trash for travel to and from the gravelpit site, as well as to provide access to disposal locations along the new road bed.

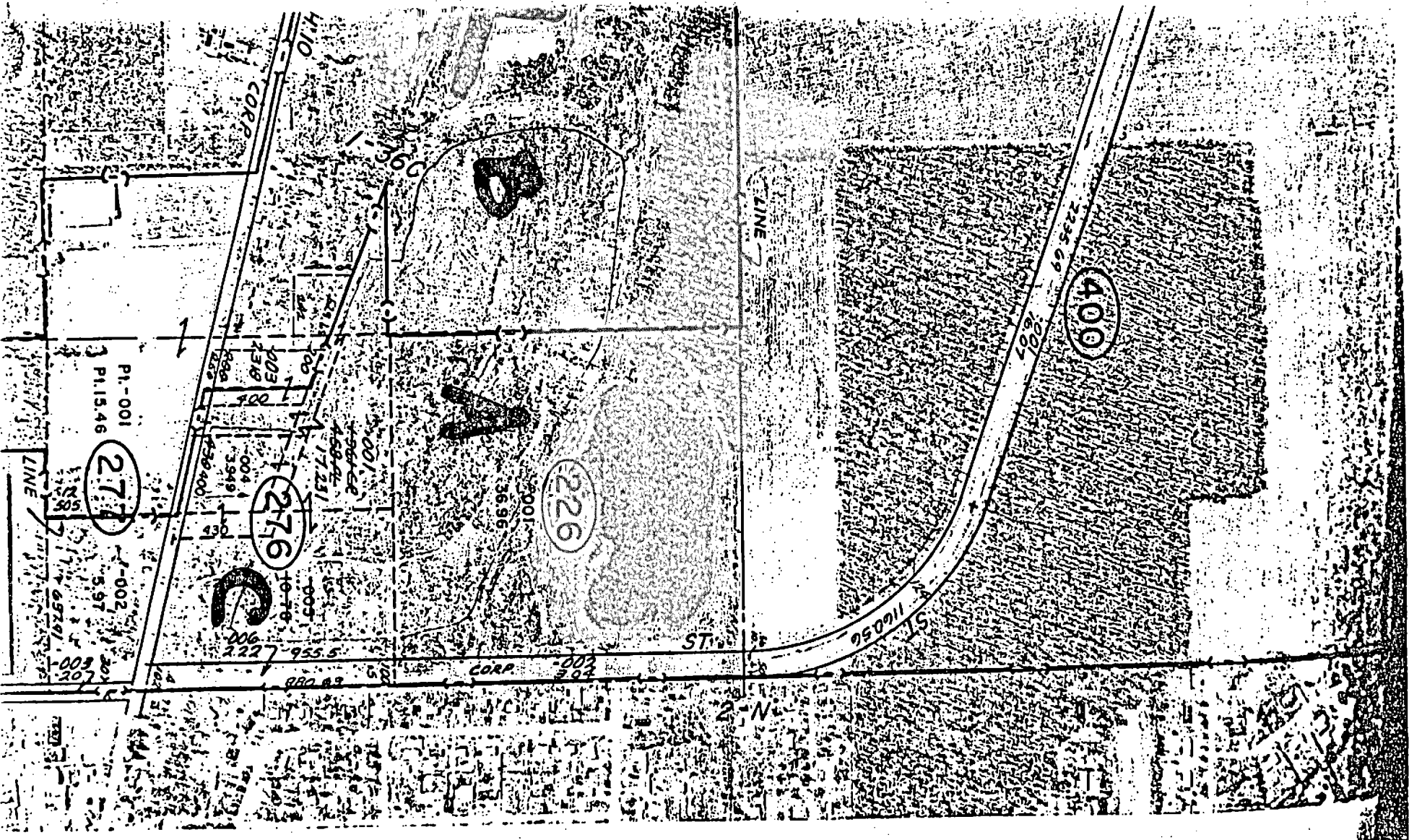
During the entire existence of the Landfill, all of Miles Laboratories, Inc. materials disposed of were hauled to the site by HIMCO WASTE-AWAY SERVICES, INC. Current HIMCO WASTE-AWAY SERVICES, INC. employees, know of no known liquids ever being disposed of on the site as part of Miles

Laboratories, Inc.'s wastes or the wastes of any other customer. During peak production times when Miles was working 7 day/week, 24 hour/days, it could send as much as 320 cubic yards of calcium sulfate to the Landfill site per day (see Tab 22).

The site was never inspected by any governmental agency until approximately 1973, when complaints regarding well water were received. These inspections resulted in some negative reports, which Charles Himes, Sr. through his sole-proprietorship, Chas. Himes & Sons, attempted to correct. Chas. Himes & Sons, with the assistance of HIMCO WASTE-AWAY SERVICES, INC., the primary transporter of waste to the Landfill, proceeded with a closure of the site in the fall of 1976. At that time the site was covered with approximately two feet of calcium sulfate, graded to approved contours, and the calcium sulfate covered with 6 inches to two feet of soil and seeded. There was no visible trash or debris accumulating on the surface of the land after seeding.

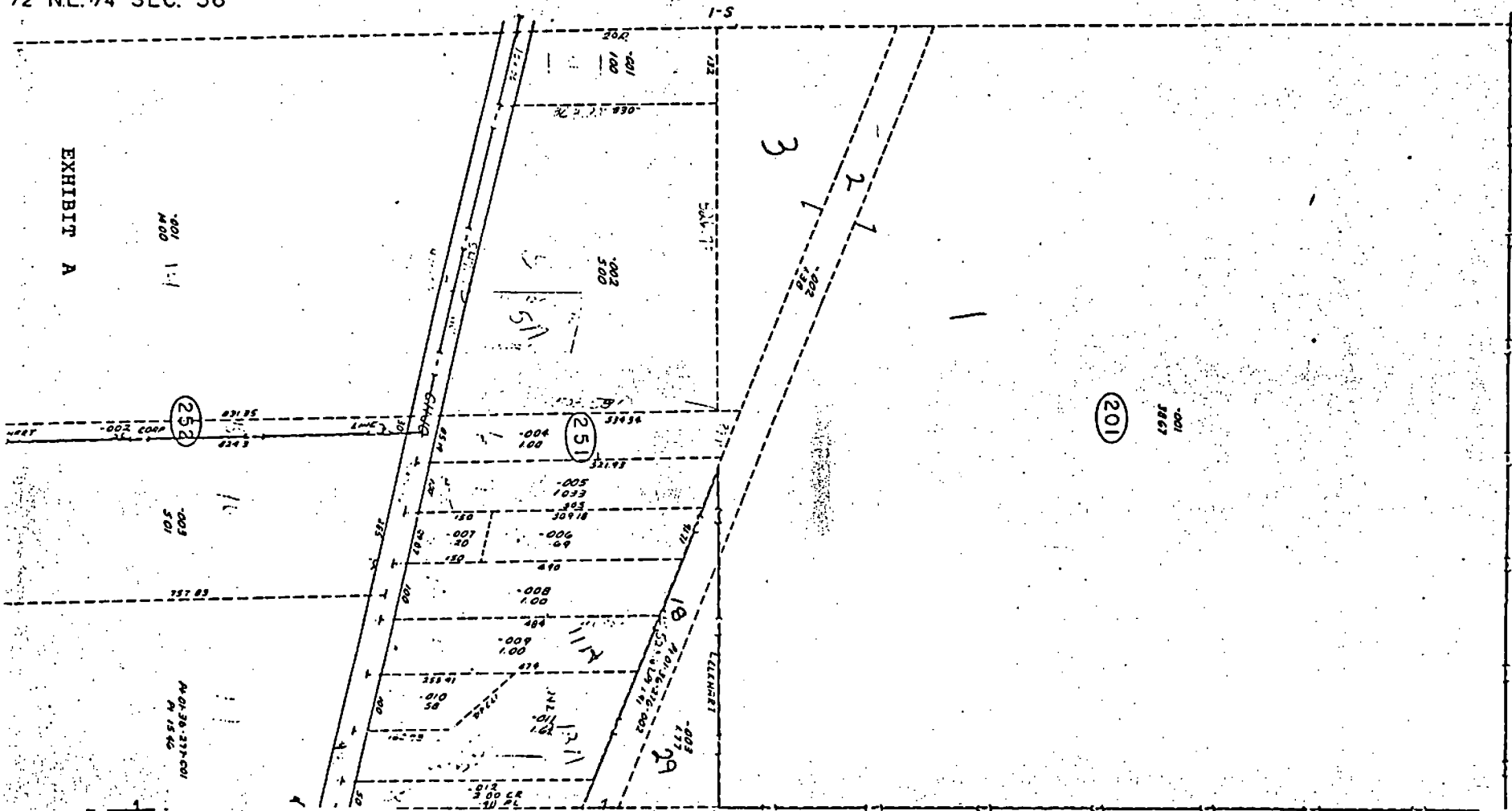
As can be seen from Tab 9 the ownership of the Landfill varied during the course of it's operations. Charles H. Himes, Sr. and his wife owned a portion of the site which has been subsequently sold. Another portion was owned by Mr. & Mrs. Henry Cohen and sold to Miles Laboratories, Inc. while the Landfill was in operation. At no time was any portion of the Landfill ever owned or operated by HIMCO WASTE-AWAY SERVICES, INC. or Mr. Charles H. Himes, Jr.

0429P



1/2 N.E. 1/4 SEC. 36

7/17/14 section 20 township 20 range 6



COUNTY OF ELKHART)

) SS:

STATE OF INDIANA)

AFFIDAVIT

COMES NOW, Ronald Taylor being first duly sworn upon his oath deposes and says as follows:

1. That he is a resident of the County of Elkhart, State of Indiana, and has been for more than the last 30 years.

2. That he is now and has been for 16 years employed by the Elkhart County Abstract Company, Elkhart, Indiana, a corporation maintaining a general title business in Elkhart County.

3. That he is familiar with the tract books and other evidence of ownership of interest in real estate in Elkhart County and has made a survey of the ownership of the real estate comprising the location of the former C.R. 10 Landfill in Elkhart County.

4. That attached hereto are Exhibits "A" and "B" which are two diagrams showing the real estate interest in the area of the C.R. 10 Landfill.

5. That on August 8, 1956, Mr. & Mrs. Ira E. Rogers took title to that portion of the real estate designated as tracts 1, 2 and 3 on Exhibit "A".

6. That by Deed dated February 6, 1968, Mr. & Mrs. Rogers deeded the subject real estate, again identified as tracts 1, 2 and 3, to Josephine L. Cooper.

7. That on April 27, 1973, Josephine L. Cooper deeded the subject real estate to CLD Corporation which has owned the real estate identified as tracts 1, 2 and 3 from that time to the present.

8. That for more than ten (10) years prior to December 31, 1969, Henry Cohen and Mollie Cohen, husband and wife, owned that portion of the real estate designated as tract 26, on Exhibit B attached hereto.

9. That on December 31, 1969, Henry Cohen and Mollie Cohen sold that piece of property identified in Exhibit "B" as tract 26 to Miles Laboratories.

10. That with the exception of a transfer of One Hundred (100) feet from the Easterly boundary of said property by parallel lines to the City of Elkhart, Indiana, the property has remained through this date in the name of Miles Laboratories, Inc.

11. That on April 29, 1941, Mr. & Mrs. Elsworth J. Glick took title to that portion of the real estate identified as tracts 21, 22 and 23. That further, Mr. & Mrs. Glick took title to that portion of the real estate identified as tracts 29, 29A, 19 and 19A on October 2, 1948.

12. That on August 6, 1961, Mr. & Mrs. Glick sold the parcels identified as tracts 22, 23, 29 and 29A, on the attached Exhibit B to Charles H. Himes, Sr. and Grace A. Himes, husband and wife.

13. That on June 6, 1967, Mr. & Mrs. Glick sold to Mr. & Mrs. Himes that portion of the real estate designated as tract 21 in the attached Exhibit "B".

14. That on March 12, 1973, Mr. Harry B. Weiler and his wife Mabel G. Weiler conveyed to Charles H. Himes, Sr. and Grace A. Himes that real estate identified as tract 28 on the attached Exhibit "B".

15. That on January 27, 1973, Arthur L. Thornton and his wife Adelyn C. Thornton conveyed to Charles C. and Grace A. Himes, Sr. a portion of the real estate identified as tract 28A on Section B.

16. That on January 24, 1974, Charles C. and Grace A. Himes, Sr. deeded that tract identified as 28A on attached Exhibit "B" to the Indiana and Michigan Electric Company.

17. That on June 7, 1965, Mr. & Mrs. Thornton conveyed to Noble Bowers and Selma Bowers, husband and wife that tract of real estate identified as tract 27 in the attached Exhibit B.

18. That on September 24, 1976, Mr. & Mrs. Thornton deeded that portion of the real estate identified as

tracts 13, 27 and 30 to Mr. Charles C. and Grace A. Himes, Sr. as husband and wife.

19. That on June 23, 1976, Mr. & Mrs. Harry B. Weiler conveyed that property identified as tracts 13, 27 and 30 on the attached Exhibits "A" and "B" to Charles H. Himes, Sr. and Grace A. Himes, husband and wife.

20. That on July 1, 1977, Charles C. Himes and Grace A. Himes conveyed those tracts identified as 13, 27 and 30 on the attached Exhibit "A" to Noble Bowers and Selma Bowers, husband and wife.

21. That on July 10, 1984, Noble Bowers and Selma Bowers, husband and wife, conveyed those areas identified as tracts 11A, 13A, 27 and 30 to Alanzo Craft, Jr.

22. That on May 7, 1974, Charles C. Himes and Grace A. Himes, husband and wife conveyed One Hundred (100) feet off the East side of tracts 22, 23, and 29 to the City of Elkhart, Indiana.

23. That on December 21, 1983, Charles C. Himes and Grace A. Himes conveyed tracts 24 and 29 to Peter and Ruth Falcone, husband and wife.

24. That on September 16, 1985, Peter Falcone and Ruth Falcone, husband and wife conveyed tracts 22, 23, 28 and 29 to Alanzo Craft, Jr.

25. That your Affiant gives this Affidavit solely to identify the titleholders of record as they as appear

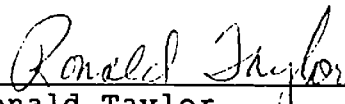
on the records of the Recorder of Elkhart County, Indiana for those periods of time from 1960 through 1976 for those portion of real estate identified in the attached Exhibits "A" and "B".

26. That at no time between 1960, and the present did HIMCO WASTE-AWAY SERVICES, INC. ever own any interest of record in any of the real estate referred to in this Affidavit.

27. That your Affiant makes no representations as to the environmental state of any of the tracts of real estate identified in this Affidavit nor does he attest to have any environmental knowledge or expertise.

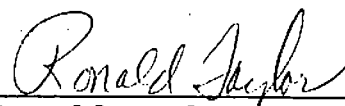
Further your Affiant sayeth not.

This Affidavit dated this 22nd day of August, 1988.
Executed in Elkhart County, Indiana.



Ronald Taylor


I affirm under the penalties for perjury that the foregoing representations are true and correct to the best of my knowledge.



Ronald Taylor

STATE OF INDIANA)
)SS:
COUNTY OF ELKHART)

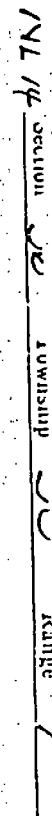
Before me the undersigned, a Notary Public for Elkhart County, State of Indiana, personally appeared Ronald Taylor and acknowledged the execution of the foregoing instrument this 22nd day of August, 1988.


Richard W. Paulen

0406P

N.E. 1/4 SEC. 36

EXHIBIT A





STATE OF INDIANA
OFFICE OF THE SECRETARY OF STATE

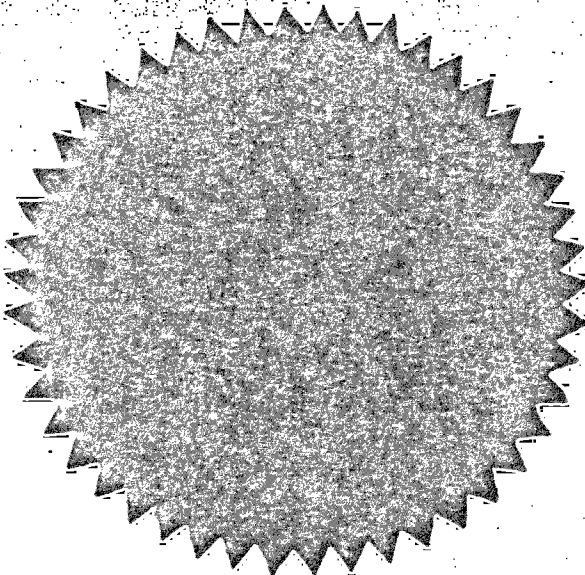
6812-466

CERTIFICATE OF INCORPORATION
OF

RUNCO WASH-DRY SERVICE, INC.

I, WILLIAM N. SALIN, Secretary of State of the State of Indiana, hereby certify that Articles of Incorporation of the above Corporation, in the form prescribed by my office, prepared and signed in triplicate by the incorporator, or incorporators, and acknowledged and verified by the same before a Notary Public, have been presented to me at my office accompanied by the fees prescribed by law; that I have found such Articles conform to law; that I have endorsed my approval upon the triplicate copies of such Articles; that all fees have been paid as required by law; that one copy of such Articles has been filed in my office; and that two copies of such Articles bearing the endorsement of my approval and filing have been returned by me to the incorporators or their representatives; all as prescribed by the provisions of the Indiana General Corporation Act, as amended.

Wherefore, I hereby issue to such Corporation this Certificate of Incorporation, and further certify that its corporate existence has begun.



In Witness Whereof, I have hereunto set my hand and affixed
the seal of the State of Indiana, at the City of Indianapolis,
this 27th day of
December 68
19.....

WILLIAM N. SALIN, Secretary of State.

By.....
Deputy

ARTICLES OF INCORPORATION

Prescribed by the Secretary of State of Indiana

Use White Paper—Size 8½ x 11 Inches

Filing Requirements—Present 3 Executed Copies to Secretary of State.

Recording Requirements—Record 1 of such 3 Executed Copies, as Approved and Returned by Secretary of State, with Recorder of County where Principal Office is Located.

APPROVED

AND
FILED

DEC 2 1968

William H. Selin

SECRETARY OF STATE INDIANA

ARTICLES OF INCORPORATION

OF

HIMCO WASTE-AWAY SERVICE, INC.

RECEIVED

DEC 2 1968

The undersigned incorporator or incorporators, desiring to form a corporation (hereinafter referred to as the "Corporation") pursuant to the provisions of The Indiana General Corporation Act, as amended (hereinafter referred to as the "Act"), execute the following Articles of Incorporation.

ARTICLE I

Name

The name of the Corporation is..... Himco Waste-Away Service, Inc.

ARTICLE II

Purposes

The purposes for which the Corporation is formed are:

(a) To engage in the business of collecting, transporting, disposing of, buying and selling, or otherwise handling and dealing in all kinds of waste, scrap and junk material, and to engage in all kinds of business relating thereto.

(b) To operate, lease, manufacture, construct, buy and sell, and generally deal in all containers, equipment, methods or systems, used to collect, haul, dispose of, or otherwise handle all kinds of waste, scrap, and junk materials, and to engage in the installation, alteration, and repair thereof;

(c) To buy, hold, own, improve, manage, operate, lease as lessee or as lessor, sell, convey and/or mortgage, either alone or in conjunction with others, real estate of every kind, character and description whatsoever and wheresoever situated, and any interest therein; and to purchase, acquire, hold, mortgage, pledge, hypothecate, exchange, sell, deal in and dispose of, alone or in syndicates, or otherwise in conjunction with others, commodities and other personal property of every kind, character and description whatsoever and wheresoever situated, and any interest therein;

(d) To acquire and dispose of all or any part of the good will, rights, property and business of any person, entity, partnership, association or corporation heretofore or hereafter engaged in any business which the corporation has power to conduct; to pay for the same in cash or in stocks, bonds or other obligations of the corporation, or otherwise; and to assume in connection therewith any liabilities of any such person, entity, partnership, association or corporation, and conduct in any lawful manner the whole or any part of the business thus acquired;

(e) To enter into partnerships or joint ventures for carrying on any lawful business for which the corporation is organized;

(f) To act as agent or representative of others for any lawful business purpose;

(g) To apply for, obtain, register, purchase, lease, or otherwise acquire, letters patent of the United States or any foreign country, patent rights, licenses, privileges, inventions, improvements, processes, copyrights, trademarks and trade names; to grant licenses thereunder and to sell, assign, lease, pledge, mortgage, transfer or otherwise deal in or dispose of, any such letters patent, patent rights, licenses, privileges, inventions, improvements, processes, copyrights, trade-marks and trade names;

(h) To make contracts; to make any guaranty respecting stocks, leases, securities, indebtedness, interest, contracts or other obligations; to borrow money; to issue bonds, promissory notes, debentures, and other evidences of indebtedness; to secure such evidences of indebtedness by pledge, mortgage and/or hypothecation of certain or all of the assets of the corporation; to enter into indentures specifying the various terms and incidents of such evidences of indebtedness; and to do any and all other incidental acts and things necessary to borrow money on the part of the corporation;

2

(i) To purchase, hold, sell, transfer, reissue or cancel the shares of its own capital stock or any securities or other obligations of the corporation, in the manner and to the extent now or hereafter permitted by the laws of Indiana; provided that the corporation shall not use its assets for the purchase of its own shares of stock when such use would cause any impairment of the capital of the corporation, and provided further that shares of its own capital stock belonging to the corporation shall not be voted;

(j) To do everything necessary, proper, advisable or convenient for the accomplishment of any of the purposes or powers herein set forth; to exercise all powers granted to business corporations by the corporation laws of Indiana as in force from time to time hereafter, and particularly all powers granted by Section 3 of the Indiana General Corporation Act of 1929; and to do every other act and thing incidental thereto or connected therewith; provided the same be not forbidden by the laws of the State of Indiana; and provided further that nothing contained herein shall be construed to authorize the conduct by this corporation of any business not authorized under the Indiana General Corporation Act;

(k) To conduct its lawful business within this State and in other states and to qualify for admission to do business in other states and to comply with the laws and regulations pertaining to the doing of business in such other states as may be deemed desirable, expedient and proper from time to time;

(l) The enumeration of specific powers herein is not intended as an exclusion or waiver of any powers, rights or privileges granted or conferred by the corporation laws of Indiana now or hereafter in force, or the laws of such other states in which this corporation may from time to time be conducting its business and under which the corporation may from time to time qualify.

ARTICLE III

Term of Existence

The period during which the Corporation shall continue is perpetual.

ARTICLE IV

Principal Office and Resident Agent

The post-office address of the principal office of the Corporation is 707 North Wildwood Avenue, Elkhart, Indiana 46514;

and the name and post-office address of its Resident Agent in charge of such office is Charles H. Himes, Sr.
707 North Wildwood Avenue
Elkhart, Indiana 46514

ARTICLE V

Number of Shares

The total number of shares which the Corporation shall have authority to issue is 1,000
1,000 shares consisting of -0- shares with the par value of
\$ -0- per share, and 1,000 shares without par value.

ARTICLE VI

Terms of Shares

There shall be one class of capital stock designated as
Common Capital Stock.

ARTICLE VIIVoting Rights of Shares

Each holder of common capital stock shall have one vote at every meeting of shareholders of the corporation, for each share of common capital stock held in his name on the records of the corporation ten (10) days before said meeting.

ARTICLE VIIIInitial Stated Capital

The Corporation will not commence business until consideration of the value of at least \$ 1,000.....has been received for the issuance of shares.

ARTICLE IXDirectors

Section 1. Number. The initial board of directors shall be composed of threemembers. The number of directors may from time to time be fixed by the by-laws of the Corporation at any number, not less than three. In the absence of a by-law fixing the number of directors, the number shall be three.....

Section 2. Qualifications. Directors.....need not.....be shareholders of the Corporation.

ARTICLE XInitial Board of Directors

Names and Post-Office Addresses. The names and post-office addresses of the first Board of Directors of the Corporation are as follows:

<u>Name</u>	<u>Number and Street or Building</u>	<u>City</u>	<u>Zone</u>	<u>State</u>	<u>Zip Code</u>
Charles H. Himes, Sr.	1224 Strong Ave.	Elkhart,	Indiana		46514
Charles H. Himes, Jr.	1429 Strong Ave.	Elkhart,	Indiana		46514
Stephen G. Himes	816 Edwardsburg (AVE)	Elkhart,	Indiana		46514

ARTICLE XIIncorporator or Incorporators

Section 1. Names and Post-Office Addresses. The name(s) and post-office address(es) of the incorporator(s) of the Corporation is (are) as follows:

<u>Name</u>	<u>Number and Street or Building</u>	<u>City</u>	<u>Zone</u>	<u>State</u>	<u>Zip Code</u>
Charles H. Himes, Sr.	1224 Strong Avenue	Elkhart,		Indiana	46514
Grace A. Himes	1224 Strong Avenue	Elkhart,		Indiana	46514
Charles H. Himes, Jr.	1429 Strong Avenue	Elkhart,		Indiana	46514

Section 2. Age. All of such incorporators are of lawful age.

ARTICLE XII

Provisions for Regulation of Business and Conduct
of Affairs of Corporation

(a) The Board of Directors of this corporation shall have power, and is hereby authorized to fix and determine the price at which, or the consideration for which, the shares of Common Stock Without Par Value of this corporation, may from time to time, be issued;

(b) The corporation shall have power to carry on and conduct its business or any part thereof, and to have one or more offices in the State of Indiana, and in the various other states, territories, colonies and dependencies of the United States, in the District of Columbia, and in all or any foreign countries;

(c) This corporation reserves the right to alter, amend, change, or repeal any provision contained in its Articles of Incorporation and in all amendments thereof, in the manner now or hereafter prescribed by statute, and all rights granted to, or conferred on the shareholders of this corporation, are granted and conferred, subject to this reservation;

(d) Any action required or permitted to be taken at any meeting of the board of directors or of any committee thereof may be taken without a meeting, if prior to such action a written consent thereto is signed by all members of the board or of such committee as the case may be, and such written consent is filed with the minutes of proceedings of the board or committee;

(e) The corporation shall have the power to indemnify any directors or officers or former directors or officers of the corporation, or any person who may have served at its request as a director or officer of another corporation in which it owns shares of capital stock or of which it is a creditor, against expenses actually and reasonably incurred by him in connection with the defense of any action, suit or proceeding, civil or criminal, in which he is made a part by reason of being or having been such director or officer, except in relation to matters as to which he shall be adjudged in such action, suit or proceeding to be liable for negligence or misconduct in the performance of duty; provided, however, that such indemnification shall not be deemed exclusive of any other rights to which those indemnified may be entitled under any provision of the articles of incorporation, bylaws, resolution, or other authorization heretofore or hereafter adopted, after notice, by a majority vote of all the voting shares then issued and outstanding;

(f) The subscriptions for and the ownership of all shares of stock in this corporation are made and taken upon the condition that any holder of shares of stock desiring to sell or otherwise transfer the same shall first offer his stock to the corporation at the book value of the stock as shown on the books of the corporation and the corporation shall have fifteen (15) days in which to exercise its option to purchase the same. Said notice shall be given by a letter addressed to the home office of this corporation. On its failure to exercise its option within said fifteen (15) days, the stockholders of this corporation shall have fifteen (15) days to exercise their option to purchase said stock in proportion to their holdings at said price. If any stockholder does not exercise his option, the remaining stockholders may exercise his option in proportion to their holdings. After the expiration of said thirty (30) days, the stockholder shall be free to make any other sale or transfer of his stock, but only if the sale or transfer is consummated within fifteen (15) days after the expiration of said thirty (30) day period.

7

IN WITNESS WHEREOF, the undersigned, being the incorporator or all of the incorporators designated in Article XI, execute these Articles of Incorporation and certify to the truth of the facts herein stated, this 19th day of December, 19 68.

Charles H. Himes Sr.
(Written Signature)

Charles H. Himes, Sr.
(Printed Signature)

Grace A. Himes
(Written Signature)

Grace A. Himes

(Printed Signature)

Charles H. Himes, Jr.
(Written Signature)

Charles H. Himes, Jr.
(Printed Signature)

STATE OF INDIANA
COUNTY OF Elkhart

SS:

I, the undersigned, a Notary Public duly commissioned to take acknowledgments and administer oaths in the State of Indiana, certify that Charles H. Himes, Sr., Grace A. Himes, and Charles H. Himes, Jr. being all of the incorporator(s); referred to in Article XI of the foregoing Articles of Incorporation, personally appeared before me; acknowledged the execution thereof; and swore to the truth of the facts therein stated.

WITNESS my hand and Notarial Seal this 19th day of December, 19 68.

Richard C. King
(Written Signature)

Richard C. King
(Printed Signature)

Notary Public

My commission expires

February 8, 1970

This instrument was prepared by CHURCH, KING & METEIVER By Richard C. King,
Attorney

8

National Priorities List

Superfund hazardous waste site listed under the
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended in 1986

HIMCO, INC., DUMP
Elkhart, Indiana

The Himco, Inc., Dump covers approximately 40 acres at County Road 10 and the Napanee Extension in the Town of Elkhart, Elkhart County, Indiana. The privately owned site operated between 1960 and September 1976. A marshy area was excavated to a depth of 10 to 20 feet, and general refuse and medical and pharmaceutical wastes were buried in the resulting hole. Industrial waste may also have been landfilled, according to the company and a report prepared by the Indiana Department of Natural Resources and the Elkhart Water Works. The owner stated that in the mid-1960s he received a permit from the city to accept municipal waste from northwest Elkhart County.

During an inspection in July 1984, EPA observed several streams of leachate. The landfill was about 15 feet above the original ground level at the center, sloping to 5 feet at the edges. Much of the landfill was covered with sand. Isolated spots of stressed vegetation were visible. Sulfur odors were strong.

EPA detected cobalt, selenium, beryllium, cadmium, copper, manganese, and other metals in monitoring wells downgradient of the site. The results corroborated analyses of residential wells conducted in 1974 by the State, which showed high manganese levels.

In 1974, the State Health Commissioner advised the owner to drill deep wells to replace six contaminated shallow residential wells. In 1975, the owner signed a Consent Agreement (adopted by the Stream Pollution Control Board) that resulted in the closing of the dump in September 1976.

The dump is located above a continuous portion of the shallow aquifer system that is the sole source of drinking water for the community. A conservative estimate is that wells within 3 miles of the site serving 20,000 people may be affected.

A 1980 hydrogeologic study of the area by the U.S. Geological Survey led EPA to install two interceptor wells to divert contaminated ground water away from Elkhart's North Main Street Well Field approximately 1.5 miles southeast of the site. The interceptor wells have permits under the National Pollutant Discharge Elimination System to discharge into nearby Christiana Creek.



ecology and environment, inc.

111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604, TEL. 312-663-9415

International Specialists in the Environment

NARRATIVE SUMMARY

HIMCO DUMP

ELKHART, INDIANA

The Himco Dump site covers approximately 40 acres of former marsh land. The site is located at County Road 10 and the Napanee Extension in the Town of Elkhart, located in Elkhart County, Indiana. The site operated between 1960 and 1976 under the ownership of Mr. Charles Himes. A marshy area was excavated and general refuse, medical and pharmaceutical wastes were landfilled in the resulting hole. There is also a possibility that industrial waste was buried in the excavation.

The total amount of hazardous waste landfilled at the site is unknown. According to laboratory analysis of samples taken by Ecology and Environment FIT members during the site inspection of July 30, 1984, groundwater is contaminated with cobalt, selenium, beryllium, cadmium, copper, manganese, and other inorganic metals. The Rocky Mountain Analytical Laboratory performed the above analysis which corroborated earlier residential well sample analysis which showed high manganese levels. The site is located above a continuous portion of the local outwash aquifer system that is the sole source of drinking water for the community. A conservative estimate of 20,000 people may be affected by drinking water contaminated by the site.

In 1974, Mr. Himes was advised by the State Health Commissioner to drill deep wells for six local residences that were shown to have contaminated shallow wells.

In 1975, Mr. Himes signed a consent agreement (adopted by the Stream Pollution Control Board) that resulted in the closing of the landfill in September 1976. Much of the landfill was covered by sand. Several leachate streams were visible during the site inspection of July 30, 1984 by the E & E FIT.

In 1980, the USGS conducted a hydrogeologic study of the area and this helped influence the installation by U.S. EPA of two interceptor wells to divert contaminated groundwater away from the North Main Street Well Field located approximately 1 1/2 miles south east of the site. The interceptor wells have NPDES permits and discharge into nearby Christiana Creek.

22Z:1T

COUNTY OF ELKHART)
)SS:
STATE OF INDIANA)

AFFIDAVIT

COMES NOW, Michael Terlep being first duly sworn upon his oath deposes and says as follows:

1. That he is a resident of the City of Elkhart, County of Elkhart, State of Indiana.

2. That he is employed by the City of Elkhart as Manager of the Elkhart City Water Department.

3. That he is been employed in that capacity for more than the last four (4) years.

4. That as part of his responsibilities as Manager of the Elkhart City Water Department, he is responsible for the maintenance and monitoring of the water quality of the City's wellfields.

5. That he is familiar the County Road 10 Landfill Site in Elkhart County, Indiana, a site which lies to the Northwest of the City's Main Street wellfield.

6. That he is familiar with the U.S.G.S. Study performed in 1980 and 1981, on the ground water in Northwest Elkhart County as it relates to the County Road 10 Landfill Site and an industrial site on the East of the City of Elkhart, that study being titled Hydrologic and Chemical Evaluation of the Ground Water Resources of Northwest Elkhart Count, Indiana,

and the continued monitoring performed by the U.S.G.S. annually since that time.

7. That the City of Elkhart has placed two interceptor wells on the East side of it's Main Street wellfield.

8. That placement of the aforementioned interceptor wells was not in any way influenced by any actual or suspected plume of contamination or threat of contamination emanating from the County Road 10 Landfill Site and that, in fact, the interceptor wells are not placed in a position which would afford the City any benefit in the event of a plume of contamination originating from the West of it's Main Street wellfield.

9. That the interceptor wells placed at the Elkhart City Main Street wellfield were required to address a problem arising from a source, totally different, distinct and geographically separated from the County Road 10 Landfill.

10. That your Affiant is unaware of any problems created for the Elkhart City Water Department or any of it's wellfields as a result of the Landfill at County Road 10 in Elkhart County.

11. That the City of Elkhart maintains monitoring wells and does regular testing of it's well water quality and that no plume of contamination rising from the County Road 10 Landfill Site has to the best of your Affiant's knowledge, affected any of the City's wellfields.

12. That by reason of the design of the Elkhart City Water Departments mains and pumping stations, water from any wellfield could mix and be involved with the water from any other wellfield and be distributed to any customer in the City. By the same mechanism, however, any of the City's wellfields could be taken out of the system as required in response to any water contamination problems with a corresponding loss of supply capability.

13. That the U.S.G.S. has continued to monitor the County Road 10 Landfill site and that the distribution and concentration of the bromide ion being monitored has in fact decreased as indicated by the diagrams attached hereto as Exhibits i, ii, iii, iv, v, vi, vii and viii.

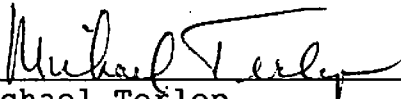
14. City water could be made available to the great majority of the property owners who could potentially be effected by any plume of contamination which might emanate from the County Road 10 Landfill site, as all of the areas in the path of any plume following the U.S.G.S. pattern have city water available except residences along County Road 10 and a small area south of Bristol Street.

15. That the route of the main from the City's new North wellfield will cross the intersection of County Road 10 and the Nappanee Street Extention and no technical reason exists which would preclude the running of a lateral main along

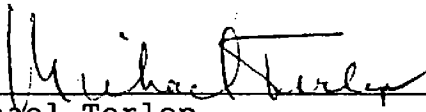
County Road 10 east to County Road 3, or the providing of city water to the currently unserved area south of Bristol Street.

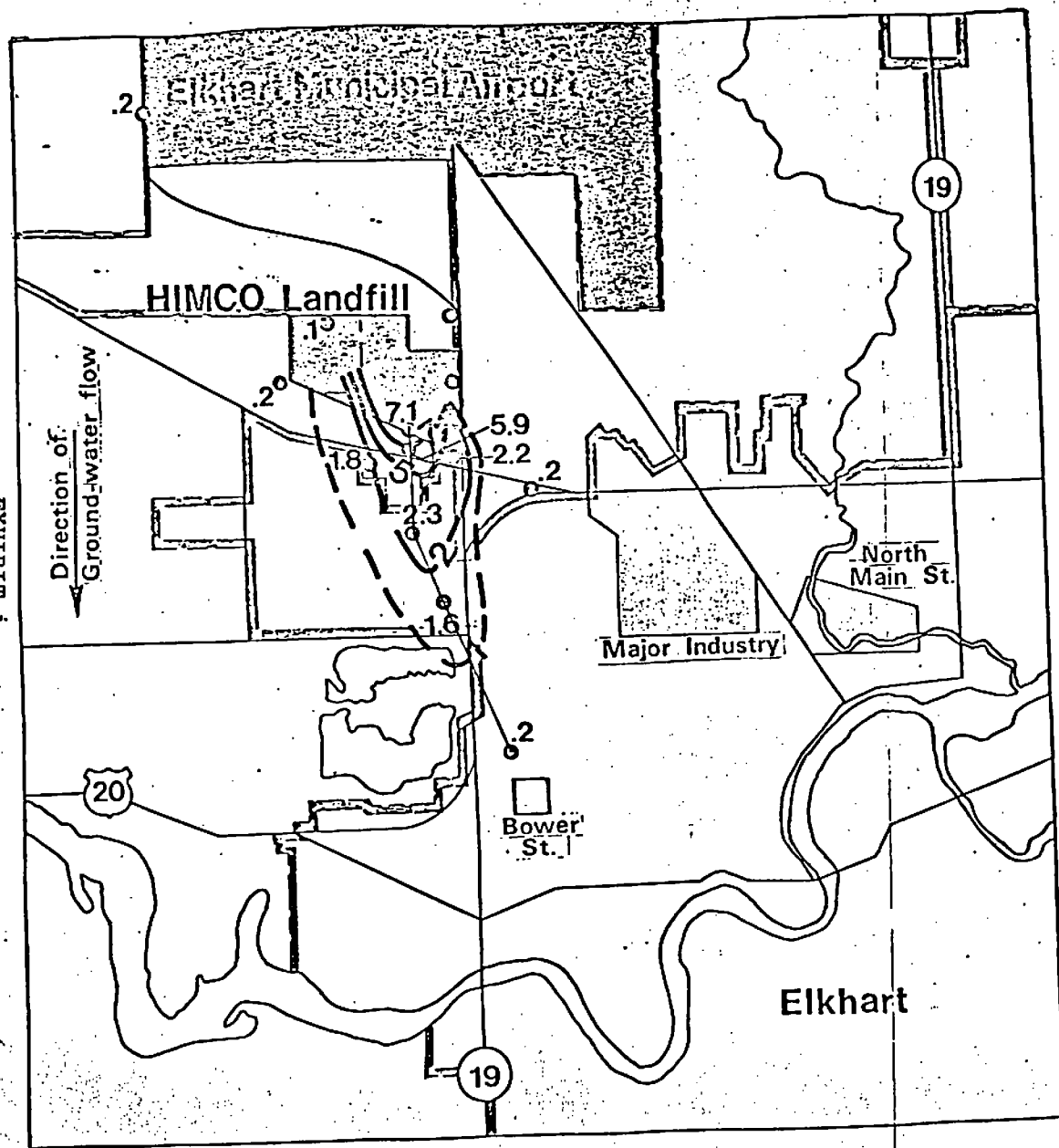
Further your Affiant sayeth not.

Dated this 19th day of August, 1988.


Michael Terlep

I affirm under the penalties for perjury that the foregoing representations are true and correct to the best of my knowledge.


Michael Terlep



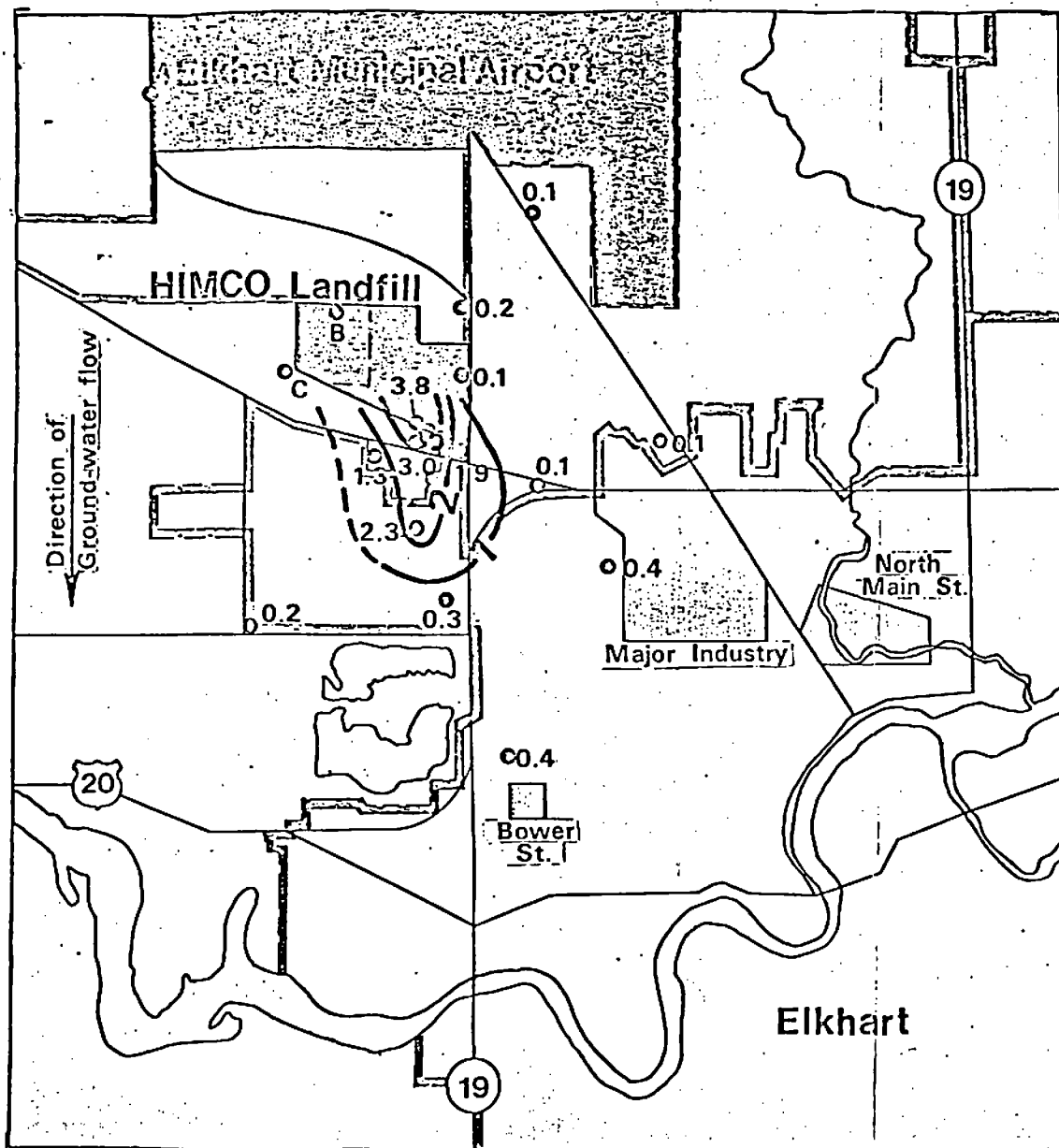
Areal distribution of
Bromide concentrations in
the Shallow Aquifer,
September 1979.

— 2 —
Line of equal Bromide
concentration mg/L
Dashed where approximate

0.2
Well site/Bromide
concentration
mg/L

Well field

— = line of section

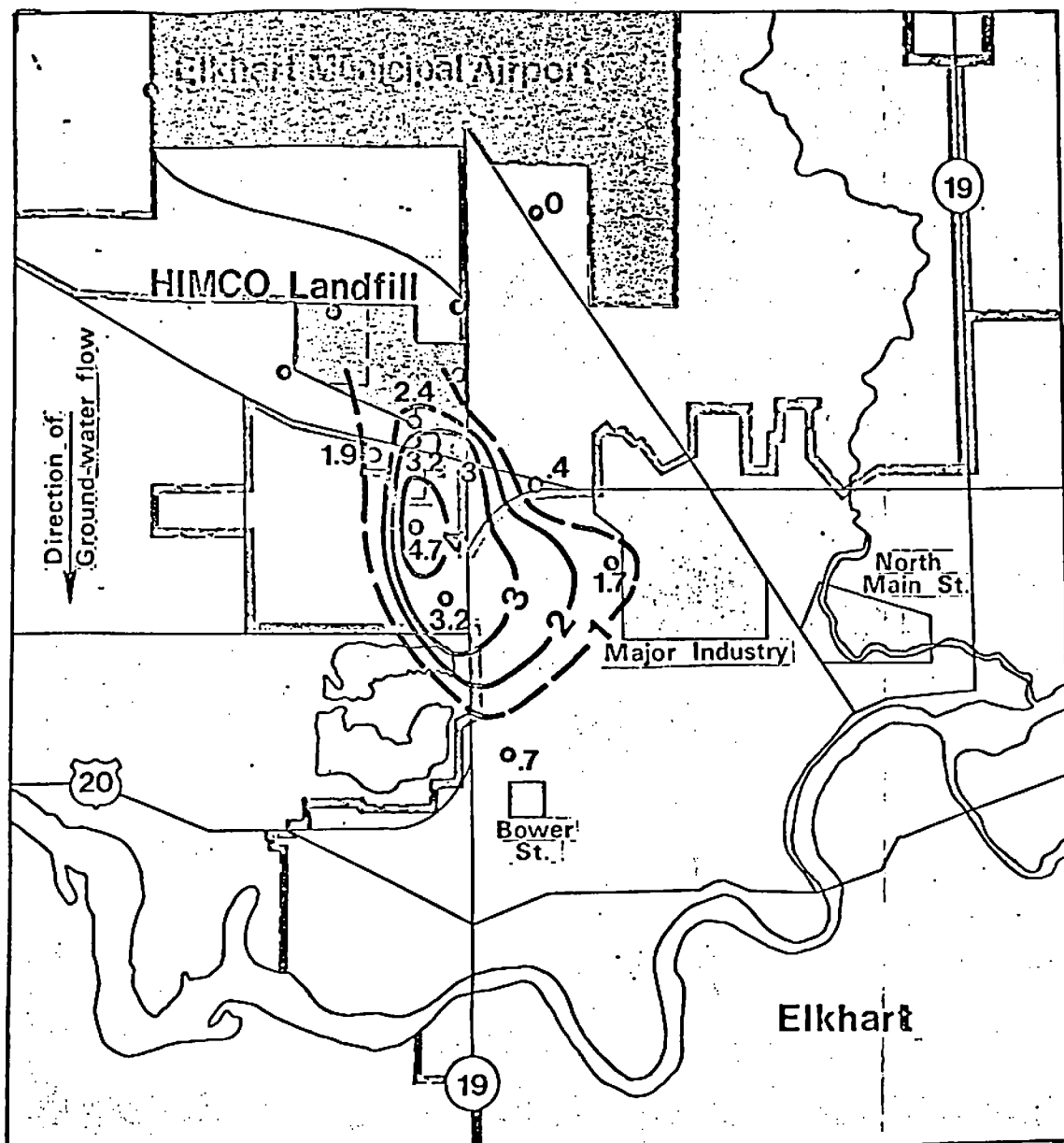


Areal distribution of
Bromide concentrations in
the Shallow Aquifer,
November-December 1980 .

— 2 —
Line of equal Bromide
concentration mg/L
Dashed where approximate

o²
Well site/Bromide
concentration
mg/L

□
Well field

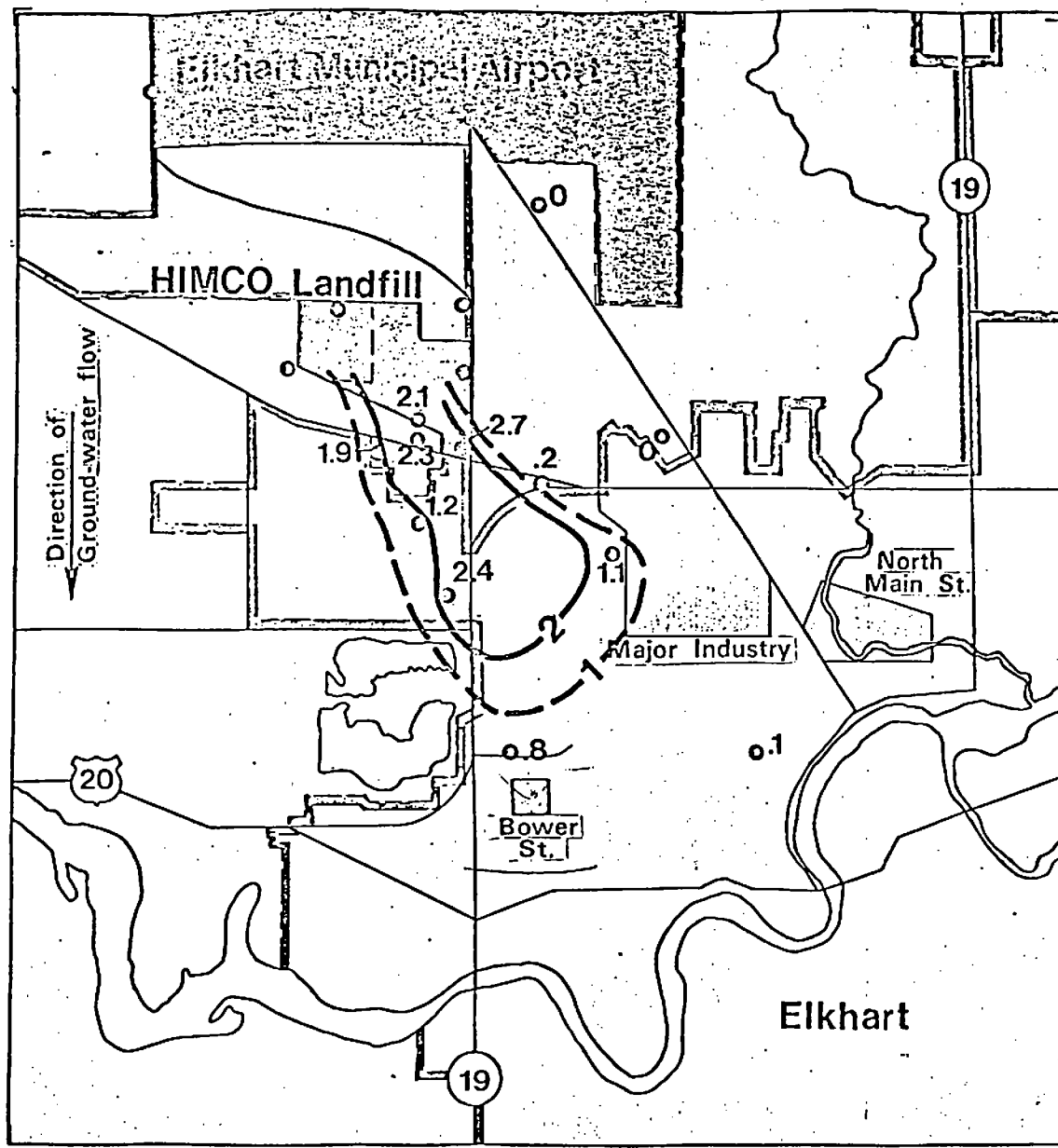


Areal distribution of
Bromide concentrations in
the Shallow Aquifer,
July-August 1982.

Line of equal Bromide
concentration mg/L
Dashed where approximate

Well site/Bromide
concentration
mg/L

Well field

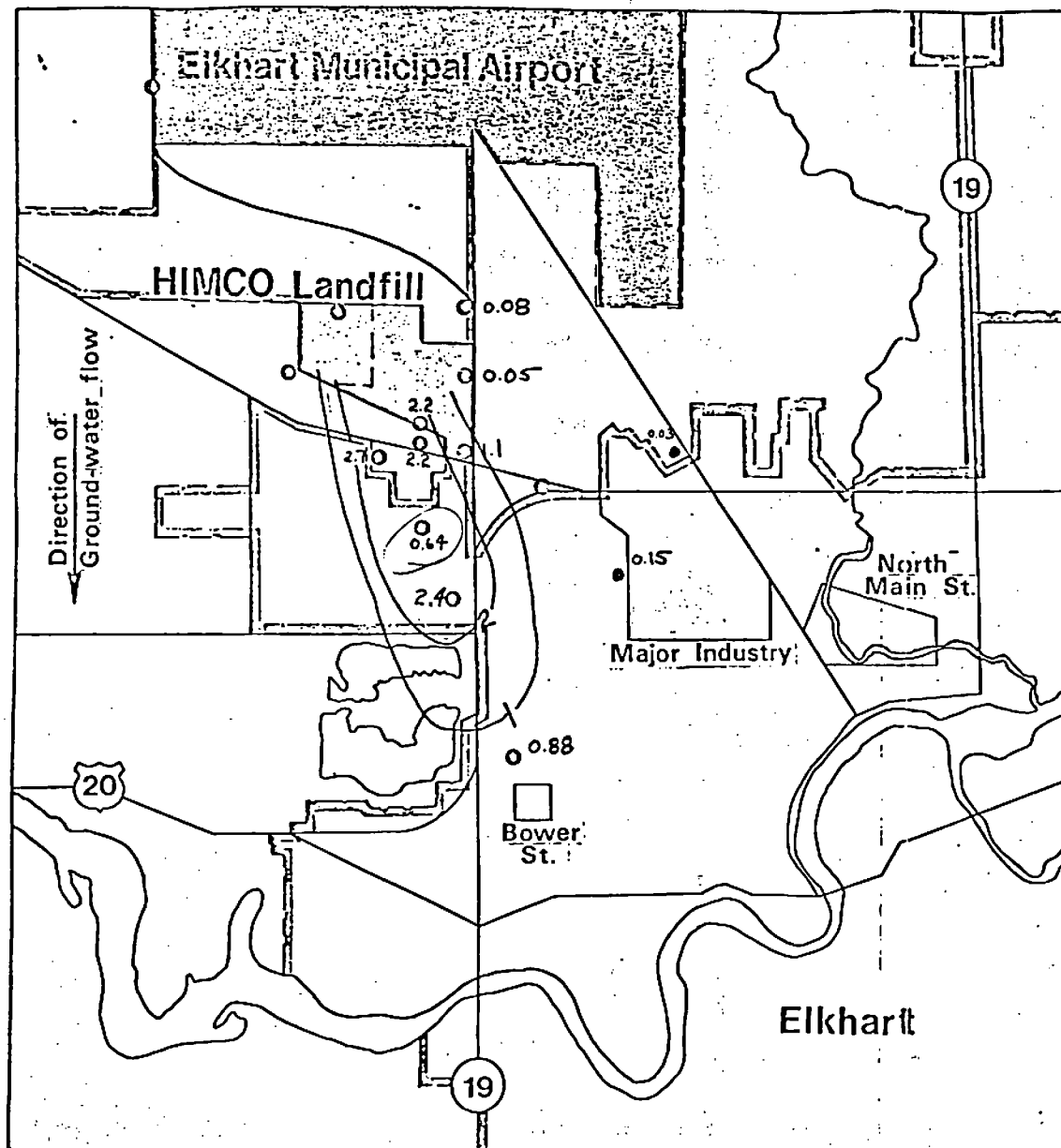


Areal distribution of
Bromide concentrations in
the Shallow Aquifer,
 July 1983.

— 2 —
Line of equal Bromide
concentration mg/L
 Dashed where approximate

0.2
Well site/Bromide
concentration
mg/L

□
Well field

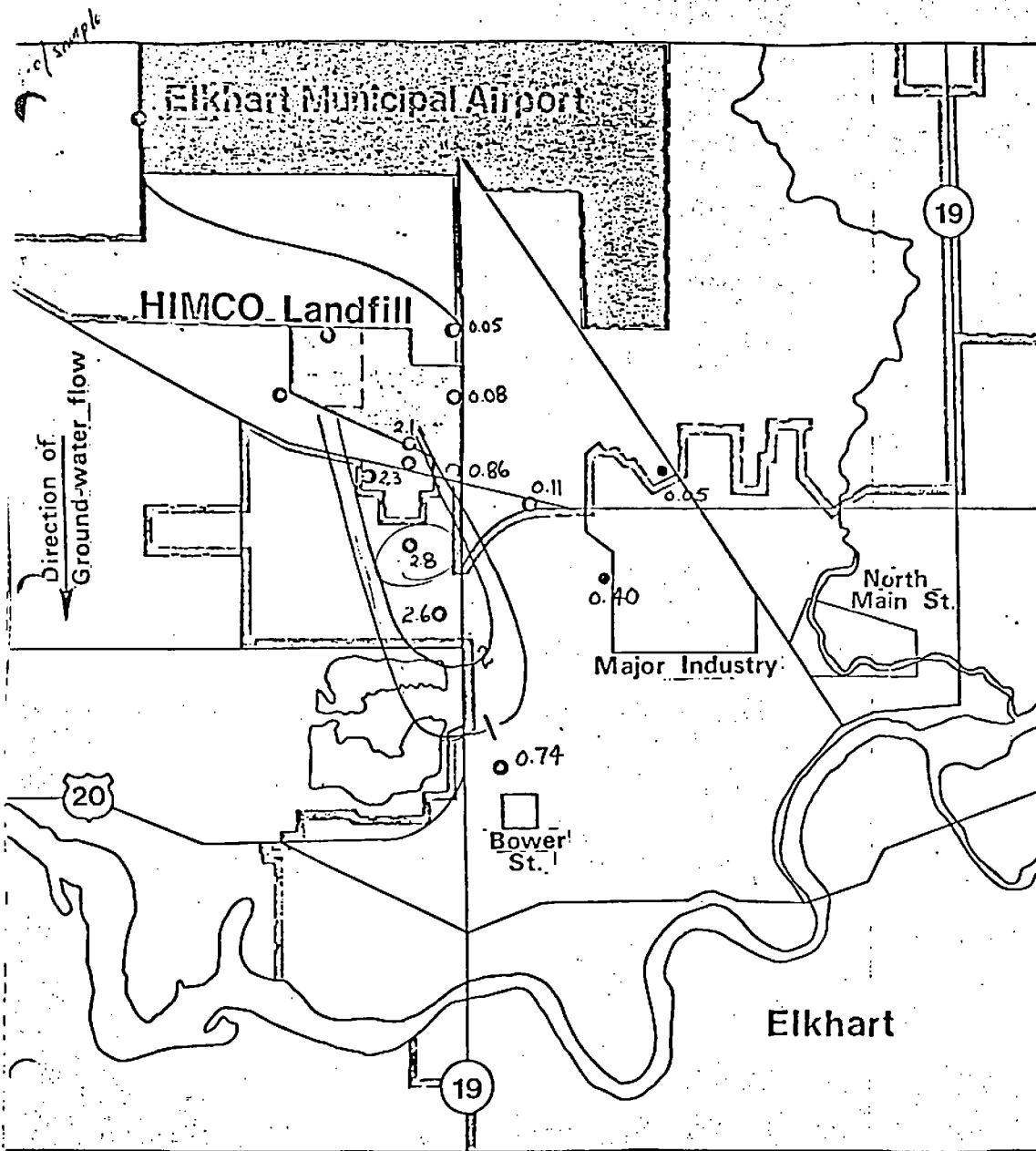


Areal distribution of
Bromide concentrations in
the Shallow Aquifer,
July 1984

— 2 —
Line of equal Bromide
concentration mg/L
Dashed where approximate

○ 0.2
Well site/Bromide
concentration
mg/L

□
Well field

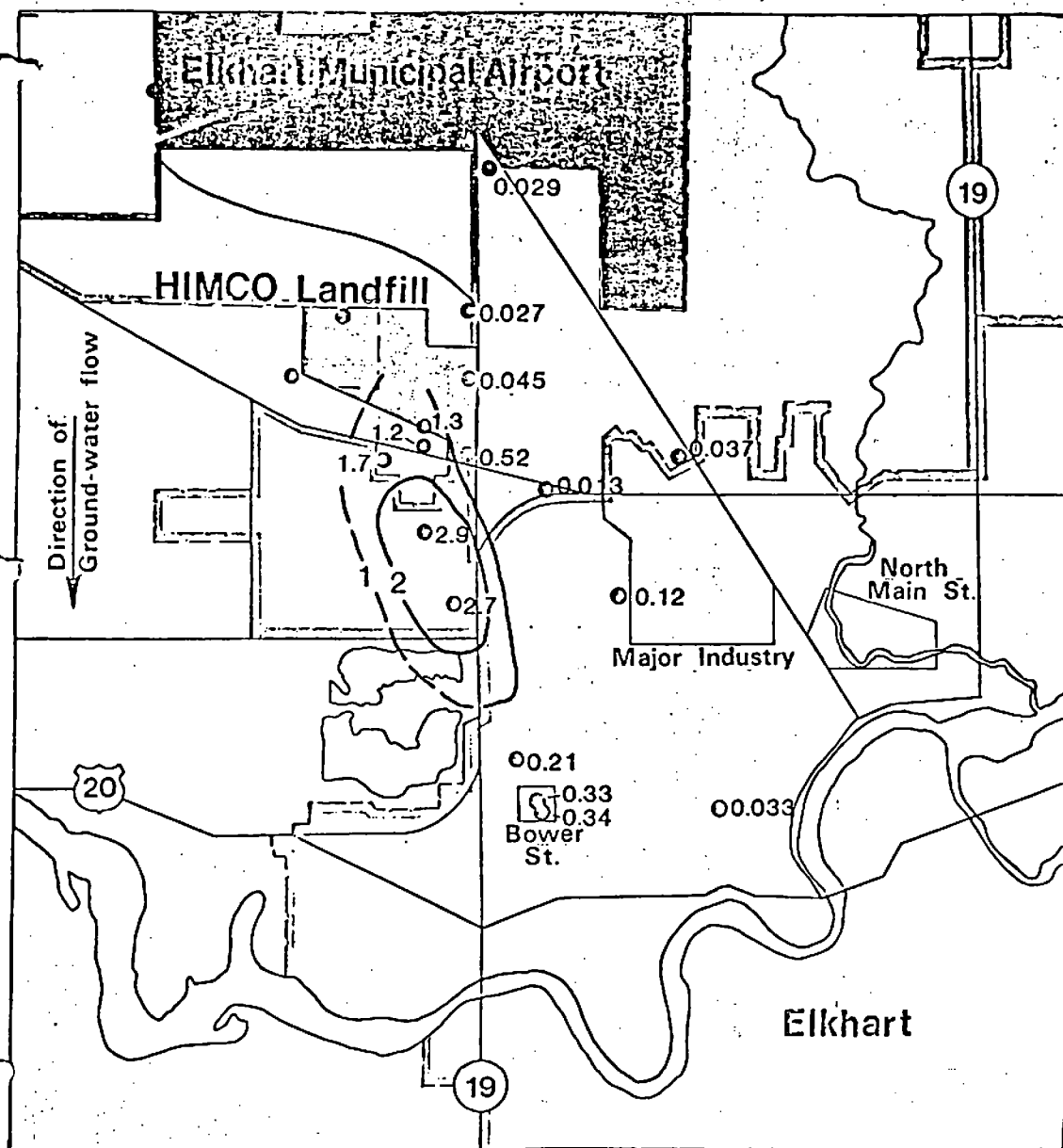


Areal distribution of
Bromide concentrations in
the Shallow Aquifer,
August 1985

— 2 —
Line of equal Bromide
concentration mg/L
Dashed where approximate

0.2
Well site/Bromide
concentration
mg/L

Well field

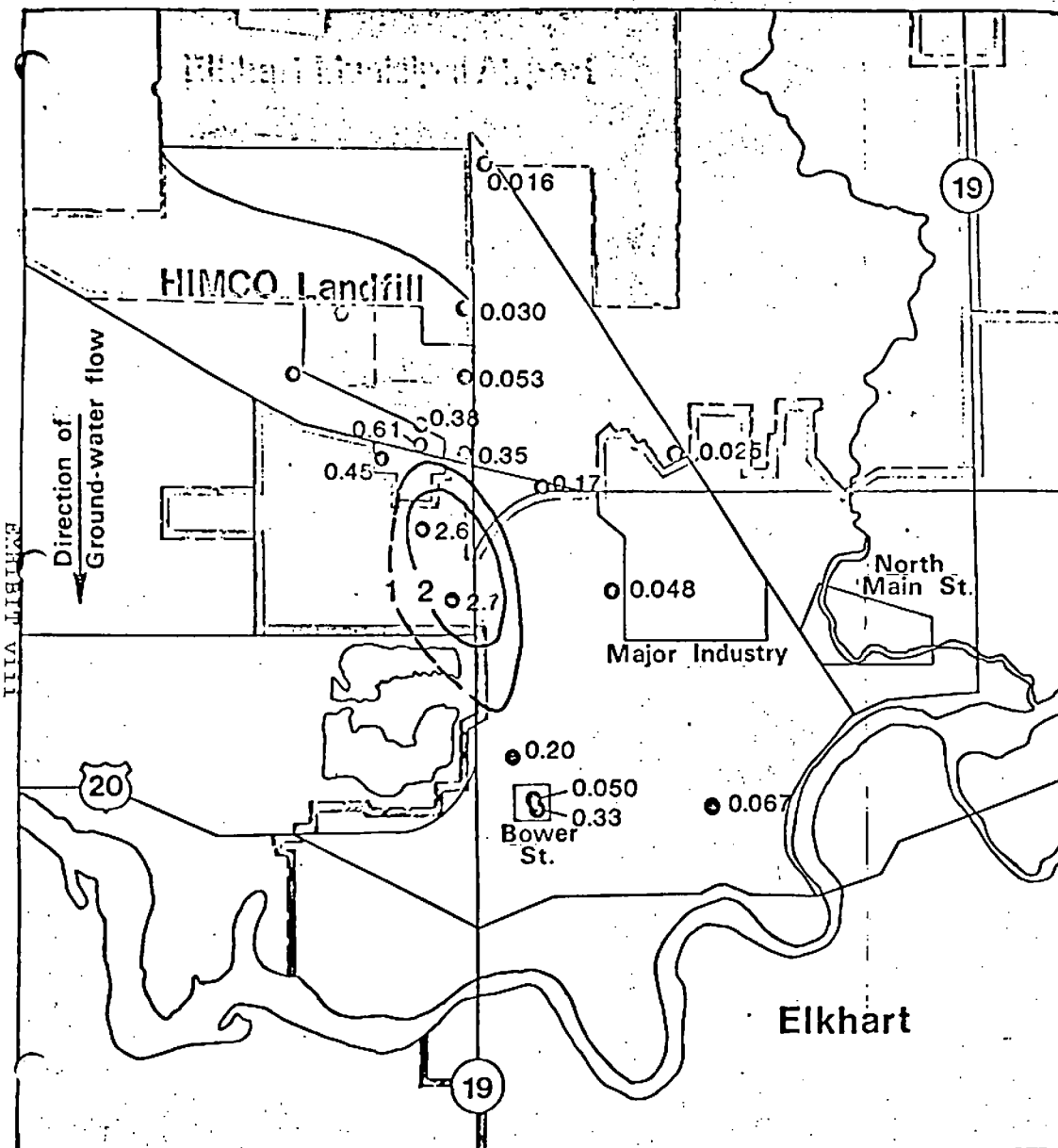


Areal distribution of
Bromide concentrations in
the Shallow Aquifer,
September 1986

— 2 —
Line of equal Bromide
concentration mg/L
Dashed where approximate

o²
Well site/Bromide
concentration
mg/L

Well field



Areal distribution of Bromide concentrations in the Shallow Aquifer, September 1987

— 2 —
Line of equal Bromide
concentration mg/L
Dashed where approximate

○ 2
Well site/Bromide
concentration
mg/L

□
Well field

SOLID WASTE DISPOSAL FACILITY INSPECTION REPORT

DATE: 2/24/76 TIME: 9 AM COUNTY: ELKHART

SUBJECT: Himco "Dump"

LOCATION: Crown CR 10 & Highway B-150

PERSON(S) CONTACTED: Jeery Perant & Jeery Senior

IS THIS OPERATION APPROVED? YES PERMIT NUMBER LANDFILL OTHER OTHER

II. TYPE OF OPERATION DUMP

III. OPERATING DEFICIENCIES

General Standards

- () 1. On-site roads passable by vehicles regardless of weather.
- () 2. Sanitary facilities meet standards.
- () 3. Livestock feeding prohibited.
- () 4. Proximity to dwellings greater than 600 feet.

Water Quality

- () 5. Groundwater monitoring wells installed in accordance with Board requirements. Sampling as specified.
- () 6. Surface drainage controlled.
- () 7. No refuse deposited in water.
- () 8. Leachate control/treatment satisfactory.

Air Quality

- () 9. Open burning () past () present

Aesthetics

- () 10. Control and/or policing of blowing paper adequate.
- () 11. Vehicular access controlled when site is not open.
- () 12. Containers at gate clean and litter free.
- () 13. Natural windbreaks and greenbelts maintained.
- () 14. Entrance sign adequate, permit numbers and working hours stated.
- () 15. Salvaged materials properly stored, and not causing operational problems.
- () 16. On-site roads constructed to minimize tracking of mud onto public roads.
- () 17. Refuse processing facilities maintained in litter free condition. Overnight storage areas enclosed.

Gases

- () 18. Decomposition gases adequately controlled.

IV. PHYSICAL CHARACTERISTICS OF SITE:

Proximity to major highways:

Proximity to dwellings:

Water on site or nearby:

Jurisdiction of site or operation: Private County Municipal

V. REMARKS FROM PART III.

REMARKS

Unsanitary Refuse (Commercial & Industrial only) VERY UNSAT

Hoping to close within next month.

NO ASKED TO DUE ATTENTION PAVING OF SITE

VI. OVERALL EVALUATION:

Overall evaluation of operation: Excellent Good Marginal Unacceptable

Overall evaluation of site: Good Marginal Poor

VII. Comments/Diagrams

Inspected by Sam Maguire
George Oliver

PERSON(S) CONTACTED *[Signature]*

Safety

() 2. Sanitary facilities meet standards.

() 2. Sanitary facilities meet standards.

() 3. Livestock feeding prohibited.

(.) 4. Proximity to dwellings greater than 600 feet.

Water Quality

· with Board requirements. Sampling as specified.

() 6. Surface drainage controlled.

7. No refuse deposited in water.

() 8. Leachate control/treatment satisfactory.

Air Quality

() 9. Open burning () past () present

Author:

() 10. Control and/or policing of blowing paper adequate.

() 11. Vehicular access controlled when site is not open.

() 12. Containers at gate clean and litter free.

(1) 13. Natural windbreaks and greenbelts maintained.

(.) 14. Entrance sign adequate, permit numbers and working

hours stated.

15. Salvaged materials properly stored, and not causing op-

erational problems.

() 16. On-site roads constructed to minimize tracking of mud

... onto public roads.

[illegible]

POSTITIVO

.....

() 18. Decomposition gases adequately controlled.

IV. PHYSICAL CHARACTERISTICS OF SITE:

Proximity to major highway: excellent

Proximity to dwellings:

Water on site or nearby:

Jurisdiction of Site or Operation

V. REMARKS FROM PART III.

 System | Remarks |

Good Operation - no vehicles

Check into Lifespanners Training class - Trip To Lark
Clark Judy - Ball State

VI. OVERALL EVALUATION:
Overall evaluation of operation: Excellent (Good) Marginal Unacceptable

Annual evaluation of after-school program

VII. Comments/Diagrams

units/diagram

CPH 081.071

993.0534

Henry Olmstead
Inspector

SOLID WASTE DISPOSAL FACILITY INSPECTION REPORT

DATE: 9/17/86 TIME: 2:00 COUNTY: Elkhart

SUBJECT: Thurg R. and

LOCATION: CR 10 + Highway at 13.5 miles

PERSON (S) CONTACTED: Calvin

2. IS THIS OPERATION APPROVED? YES ☒ NO ☐ PERMIT NUMBER 0

3. TYPE OF OPERATION LANDFILL

III. OPERATING DEFICIENCIES

General Standards

() 1. On-site roads passable by vehicles regardless of weather.

() 2. Sanitary facilities meet standards.

() 3. Livestock feeding prohibited.

() 4. Proximity to dwellings greater than 600 feet.

Water Quality

() 5. Groundwater monitoring wells installed in accordance with Board requirements. Sampling as specified.

() 6. Surface drainage controlled.

() 7. No refuse deposited in water.

() 8. Leachate control/treatment satisfactory.

Air Quality

() 9. Open burning () past () present

Aesthetics

() 10. Control and/or policing of blowing paper adequate.

() 11. Vehicular access controlled when site is not open.

() 12. Containers at gate clean and litter free.

() 13. Natural windbreaks and greenbelts maintained.

() 14. Entrance sign adequate, permit numbers and working hours stated.

() 15. Salvaged materials properly stored, and not causing operational problems.

() 16. On-site roads constructed to minimize tracking of mud onto public roads.

() 17. Refuse processing facilities maintained in litter free condition. Overnight storage areas enclosed.

Vectors

() 19. Effective vector control program.

Safety

() 20. Roll bars and fire extinguishers on rolling equipment.

() 21. Provisions available to extinguish fires.

() 22. Communication equipment available.

() 23. Scavenging prohibited.

() 24. Traffic patterns established, vehicles discharge without delay.

Operator Instructions

() 25. Operating manual, safety precautions, and procedures available.

Cover Applications

() 26. Waste spread in layers, compacted on appropriate 3:1 slope

() 27. Daily cover adequate.

() 28. Finished portions covered with minimum of two feet of earth, seeded with suitable vegetation.

() 29. Final slope not less than 2% without ponding of water.

Hazardous and Special Wastes

() 30. No unauthorized hazardous wastes accepted.

() 31. Bulky waste handling adequate.

() 32. Dead animal handling adequate.

Equipment

() 33. Refuse handling equipment adequate to spread, compact and cover waste.

Records

() 34. Set of approved plans on site.

IV. PHYSICAL CHARACTERISTICS OF SITE:

Proximity to major highways: _____

Proximity to dwellings: _____

Water on site or nearby: _____

Jurisdiction of Site or Operation: Private County Municipal

V. REMARKS FROM PART III.

1. The dump is now closed - no more refuse is deposited at the site.

2. Refuse is being used to fill in some low spots before final cover and seeding are applied.

VI. OVERALL EVALUATION:

Overall evaluation of operation: Excellent Good Marginal Unacceptable

Overall evaluation of site: Good Marginal Poor

Inspected by: _____

VII. Comments/Diagrams

3. The ponded area on CR 10 is being filled with clean fill material.

4. One small seed of leucite was observed - it is



U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Public Health Service

OFFICE OF SOLID WASTES

Public Health Service Publication No. 1012

1963

Reprinted November 1966

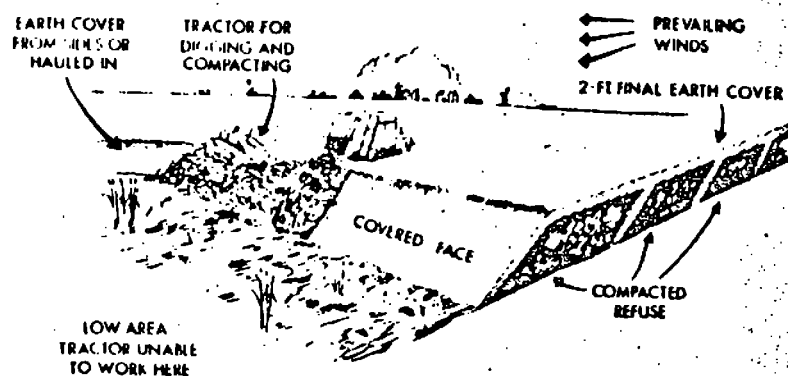
For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20540 - Price 5 cents, \$3.00 per 100

U.S. GOVERNMENT PRINTING OFFICE: 1963 O 206 202

How Sanitary Landfilling Is Done

The method of operation depends on the land available. In low swampy sites, earth cover is taken from the sides or hauled in from nearby areas. A tractor is used to spread, compact, and cover the refuse. A final 2-foot earth cover provides a seal for the completed cells. In level areas, a trench may be used. With conditions of rolling terrain, the slope method illustrated is often preferred.

In low swampy areas:



SANITARY LANDFILL...

**An Answer to a
Community Problem
A Route to a
Community Asset**



Americans are discarding solid wastes at the rate of 360 million tons annually—and the rate may double in the next decade. Disposing of these wastes is a growing problem in many communities.

The citizens of Los Angeles County are solving their problem by using sanitary landfills, such as the one at the Mission Canyon Site (cover) in the Santa Monica mountains of west Los Angeles. Two years after full-scale filling operations began in the large canyon, residential development began on the adjacent ridges. Today numerous houses, none valued at less than \$75,000, surround the 500-acre site. Small parks have been built on the land that has already been filled in. When the site is completely filled in, Los Angeles citizens will enjoy a large regional park that will include several golf courses.

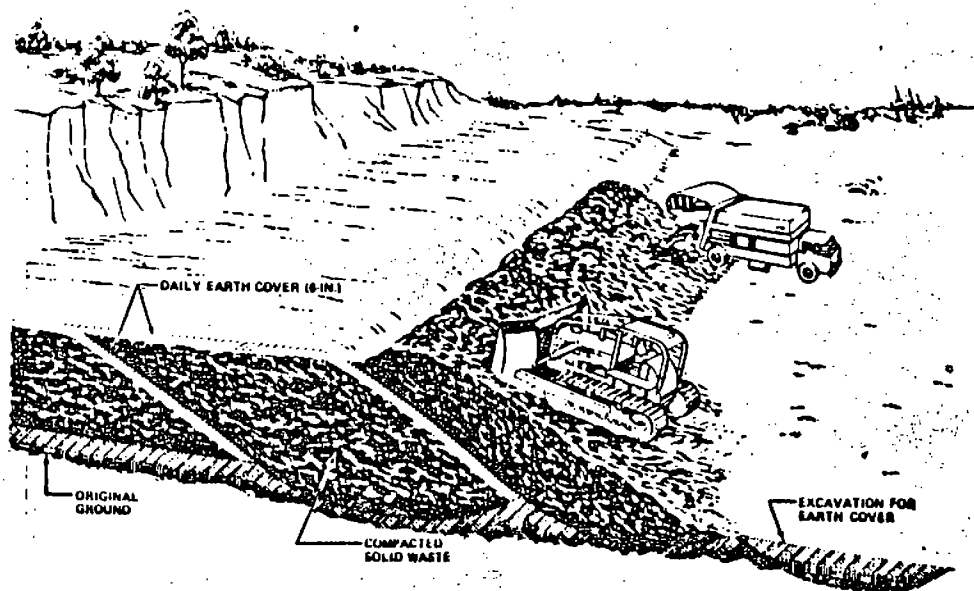
what a sanitary landfill is . . and is not

A complete solid waste handling system—storage, collection, disposal—is a basic need in every community. Sanitary landfill is a clean, practical and economical answer to a community's need to dispose of its solid wastes without creating a nuisance or hazard to public health and safety. A sanitary landfill is a far cry from the old-fashioned dump, which is a breeding ground for disease-carrying rats and insects, a polluter of air and water, a source of unpleasant odors, and a community eyesore. A competently planned and engineered sanitary landfill has none of these disadvantages.

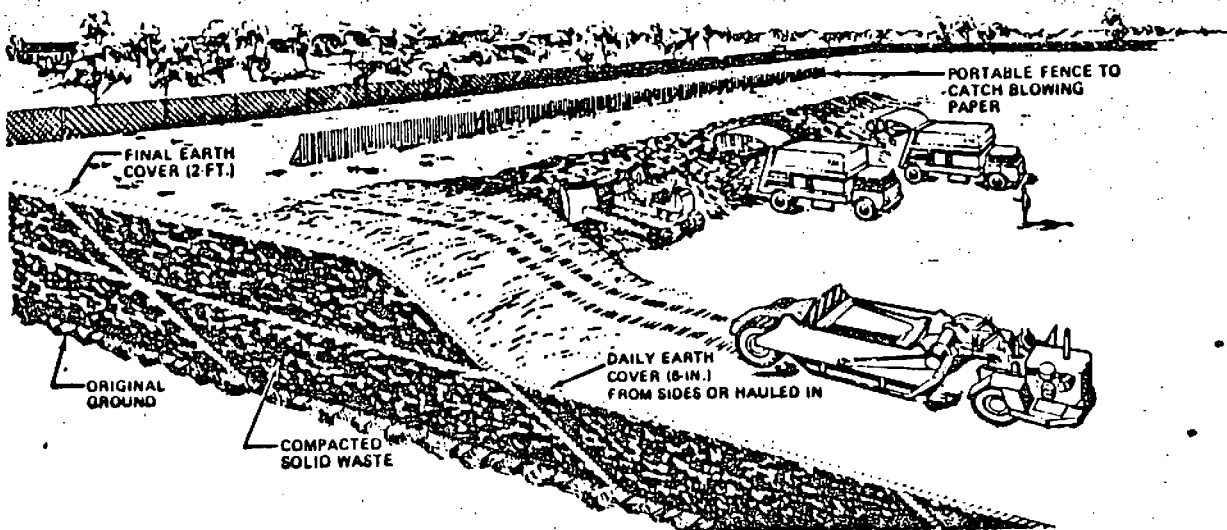
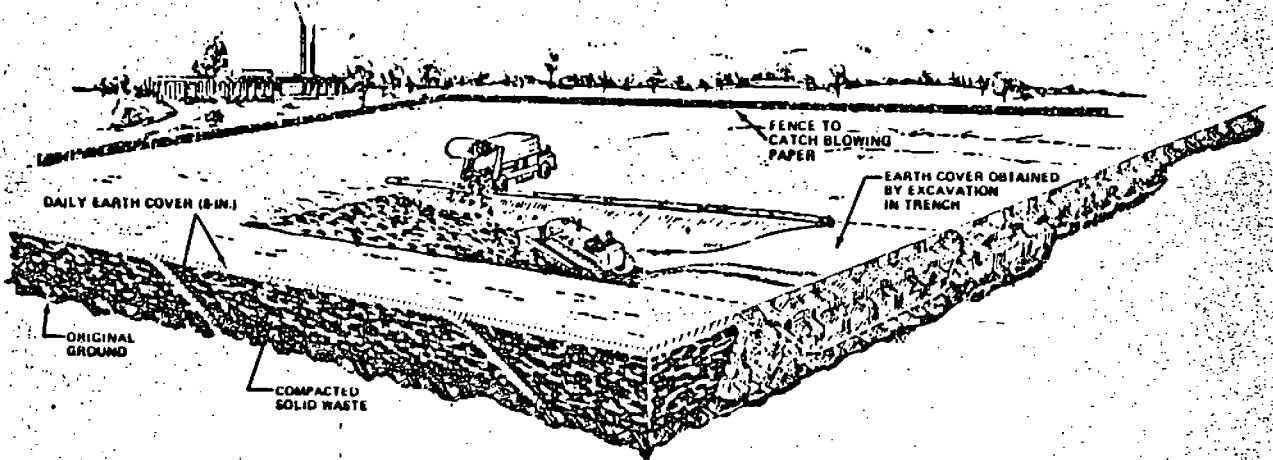
In a sanitary landfill, the wastes are spread, compacted, and then covered with a 6-inch compacted layer of earth at the end of every day—or more frequently if necessary. When a site is completely filled, it is sealed over with at least 2 feet of clean earth. In this way, communities across the country have reclaimed land, frequently of marginal value, converting it to parks, playgrounds, golf courses, botanical gardens, and other recreational areas.

Land Can Be Filled by a
Number of Methods,
Depending on the
Terrain...

Natural or man-made depressions
such as deep ravines, canyons, or
quarries can be filled by the ramp
method.



Flat or gently sloping land generally calls for the trench method.



Low areas, as well as natural or man-made depressions, can be filled by the area method.

equipment needs

One crawler tractor can handle all the solid wastes from a community of up to 60,000 people. An additional piece of equipment is generally needed for each additional 75,000 people.

cost

The cost of operating a sanitary landfill averages between \$1.00 to \$2.00 per person per year, depending on the population served. Larger operations are more efficient and economical, so small communities should consider banding together to minimize costs.

GPO : 1970 O - 408-878

remember...

A sanitary landfill is an economical and acceptable method of solid waste disposal. It is the choice of an ever-increasing number of U.S. communities—and it may be the answer to *your* community's solid waste disposal problem. Your State solid waste agency or local government can provide additional information.

PUBLIC HEALTH SERVICE PUBLICATION NO. 1012

1st printing 1963

2d printing 1966

Revised 1970

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

Environmental Health Service

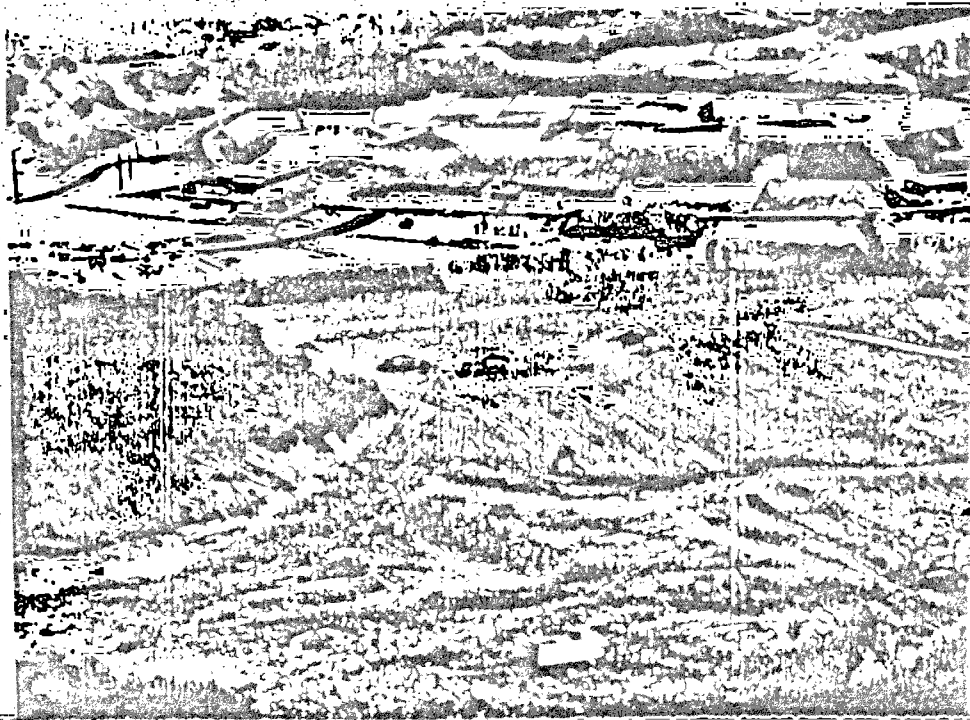
Bureau of Solid Waste Management

1970

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 - Price 10 cents; \$7.50 per 100

do you need A SANITARY LANDFILL?

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service



The residential development shown was begun after full-scale sanitary landfill operations had been conducted for 2 years. Lots immediately adjacent to the landfill are selling for \$30,000 to \$35,000; the homes being constructed are in the \$75,000 to \$100,000 category. The Mission Canyon Site shown is in the Santa Monica mountains of West Los Angeles. When completed, the 385 acre site will become a county operated regional park. The cover photograph is reprinted through the courtesy of the Los Angeles County Sanitation Districts.

12-29-86

Geoff
Pat Raynes
San Marcos

NEED A SANITARY LANDFILL?

Sanitary Landfilling is a method of disposing of garbage, rubbish, and ashes on land *without nuisance, fire, or public health hazard*. The refuse is spread, compacted, and then covered with a layer of earth.

The Refuse Problem

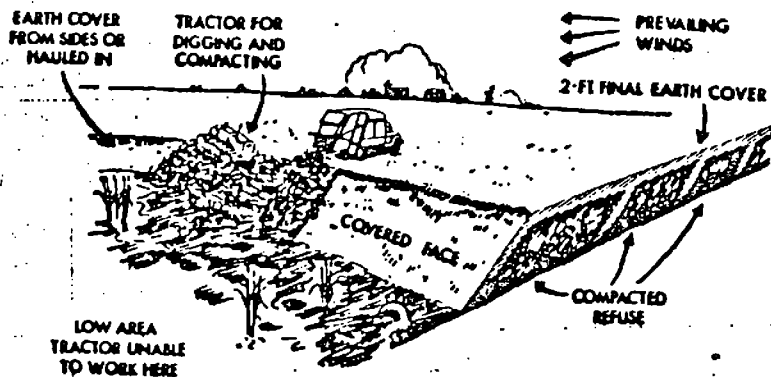
A complete refuse-handling system, including storage, collection and disposal, is basic to community health and safety in every town. Without satisfactory service and facilities, disease-carrying rats, flies and other insects breed; water and air become polluted; fire hazards increase; unpleasant odors are common; and community streets, yards, and other areas become littered and unattractive.

Old-fashioned and troublesome community dumps today have given way to sanitary landfills which are widely used and have the endorsement of public works and public health authorities because such disposal of refuse has proven satisfactory from a public health and esthetic viewpoint, and is economical. Completed landfill projects frequently result in the creation of valuable new land for parks and other recreational uses.

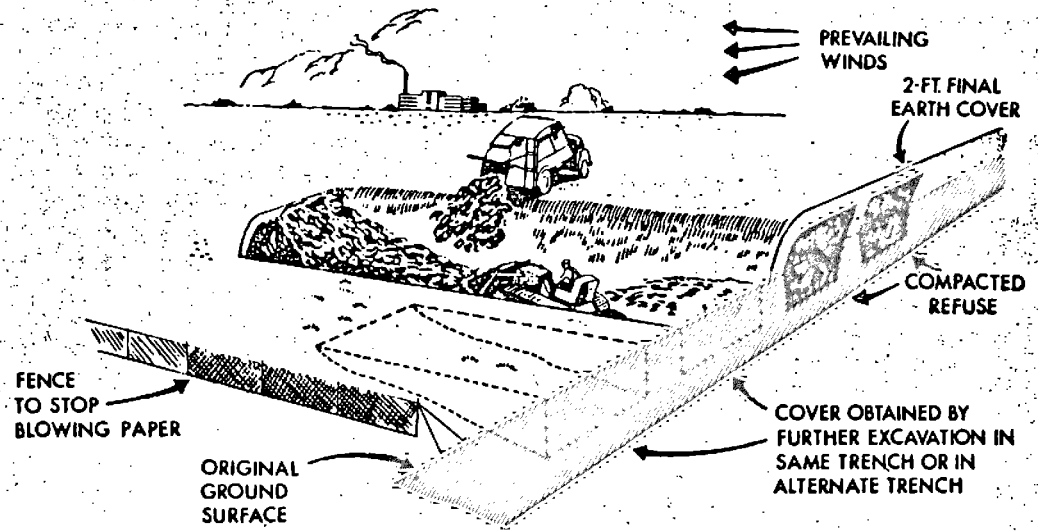
How Sanitary Landfilling Is Done

The method of operation depends on the land available. In low swampy sites, earth cover is taken from the sides or hauled in from nearby areas. A tractor is used to spread, compact, and cover the refuse. A final 2-foot earth cover provides a seal for the completed cells. In level areas, a trench may be used. With conditions of rolling terrain, the slope method illustrated is often preferred.

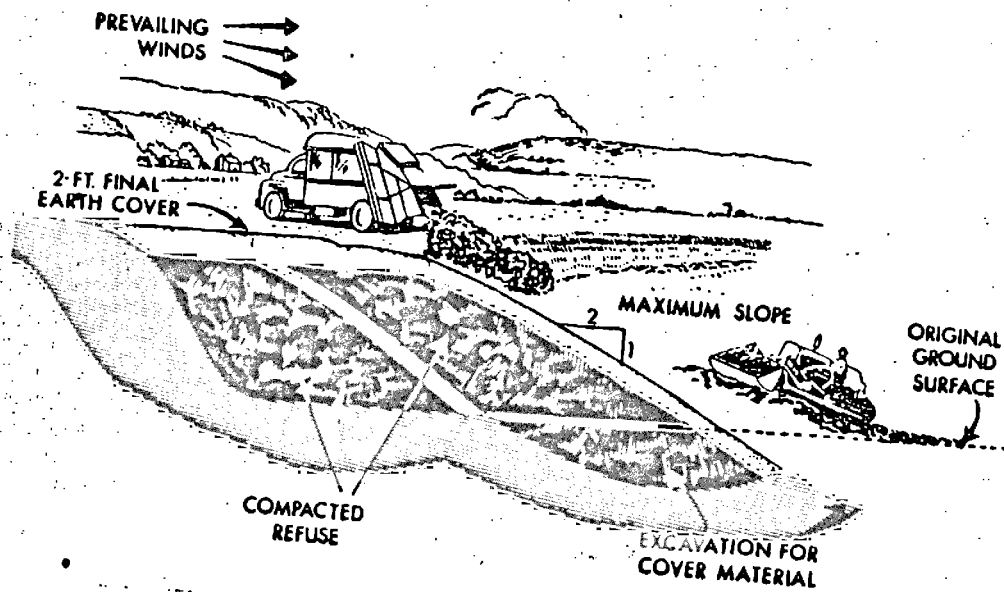
In low swampy areas:



In a flat area:



On a slope:



EQUIPMENT NEEDED

One crawler tractor equipped to move earth can handle all refuse from an average community.

COST

The cost of using sanitary landfills averages 50¢ per year per person, and is one of your most economical and worth-while investments in environmental health.

REMEMBER

Sanitary landfills are now the method of choice in more than 1,500 U.S. communities and the number is growing each year. It may be the answer to the refuse disposal problem in *your* community. Your State or local health department can help you solve your community's refuse disposal problem.



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

OFFICE OF SOLID WASTES

Public Health Service Publication No. 1012

1963

Reprinted November 1966

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Washington, D.C. 20402 - Price 5 cents; \$3.00 per 100

☆ U.S. GOVERNMENT PRINTING OFFICE : 1964-O-236-202

STATE OF INDIANA)
)SS:
COUNTY OF ELKHART)

AFFIDAVIT

COMES NOW Charles H. Himes, Jr. and being first duly sworn upon his oath states as follows:

1. That he is an adult aged 50 years, and a resident of Elkhart County, Indiana.

2. That he is the son of the late Charles H. Himes, Sr. and Grace Himes.

3. That he is the current President of HIMCO WASTE-AWAY SERVICES, INC., an Indiana corporation incorporated on the 27th day of December 1968, and has been involved with the Corporation since it's inception.

4. That he is familiar with the books and records of HIMCO WASTE-AWAY SERVICES, INC.

5. That HIMCO WASTE-AWAY SERVICES, INC. has never owned any real estate at the Northeast corner of the intersection of County Road 10 and the Nappanee Street extension in the City of Elkhart, County of Elkhart, Indiana.

6. That HIMCO WASTE-AWAY SERVICES, INC. has never operated any landfill or waste disposal facility at County Road 10 in Elkhart County, Indiana, or at any other site.

7. That HIMCO WASTE-AWAY SERVICES, INC. is now and always has been a transporter of non-hazardous solid waste from commercial and residential customers in the Elkhart County area.

8. That your Affiant has read the comment identified as Comment No. 5, SITE HISTORY, prepared on behalf of HIMCO WASTE-AWAY SERVICES, INC. for submission to the Environmental Protection Agency and believes that all of the representations made therein are true and correct.

9. That your Affiant worked for his father's businesses, Himes Cartage and Chas. Himes and Sons, both on a part time and full time basis from the time he was approximately 10 years of age until the incorporation of HIMCO WASTE-AWAY SERVICES, INC., at which time he worked full time for HIMCO WASTE-AWAY SERVICES, INC.

10. That your Affiant had numerous conversations with his father regarding the operation of the County Road 10 Landfill. That in the course of those conversations his father expressed his belief that the Landfill was located in a good and responsible location pursuant to the suggested practices of the United States Department of Health.

11. That your Affiant's father uniformly directed his employees to accept only non-hazardous solid wastes for disposal at the County Road 10 Landfill site.

12. That the Landfill was operated by your Affiant's father as a sole-proprietor conducting business under the name of Chas. Himes & Sons, an entity which he used to conduct various business activities following the birth of your Affiant.

13. That in the late 1960's and early 1970's, the health of Charles H. Himes, Sr. deteriorated as he developed severe heart problems, which ultimately claimed his life as a result of a heart attack.

14. That your Affiant, in an effort to protect his father's health, attempted wherever possible to interject himself or HIMCO WASTE-AWAY SERVICES, INC. between third party complaints and his father or his business activities, including Chas. Himes & Sons.

15. That in this relationship with his father, your Affiant met with representatives of the Stream Pollution Control Board of the State of Indiana and negotiated a Consent Agreement that resulted in the closure of the County Road 10 Landfill.

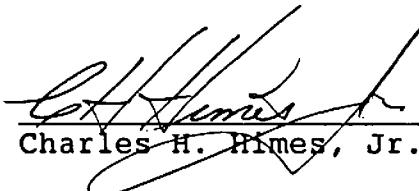
16. That although that Consent Agreement indicated an involvement of HIMCO WASTE-AWAY SERVICES, INC. in the ownership and operation of the County Road 10 Landfill those representations were made by your Affiant for the sole purpose of insulating your Affiant's father from the stress of dealing with the State and quarrelsome neighbors, actions which your Affiant believes would have been life threatening for his father.

17. That HIMCO WASTE-AWAY SERVICES, INC. disposed of a majority of the solid waste it collected in it's refuse hauling operation at the County Road 10 Landfill site

and that all of the material delivered to that site was disposed of at the direction of Charles H. Himes, Sr., doing business as Chas. Himes & Sons or his employees. HIMCO WASTE-AWAY SERVICES, INC. was never an owner or operator of the County Road 10 Landfill site.

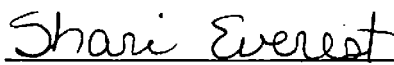
Further your Affiant sayeth not.

Dated in Elkhart, Indiana, this 22nd day of August, 1988.


Charles H. Himes, Jr.

STATE OF INDIANA)
)SS:
COUNTY OF ELKHART)

Before me the undersigned, a Notary Public for Elkhart County, State of Indiana, personally appeared Charles H. Himes, Jr. and acknowledged the execution of the foregoing instrument this 22nd day of August, 1988.


Shari Everest
Residing in Elkhart County, IN

My Commission Expires:

1-10-92

0434P

PART 1.0 BACKGROUND INFORMATION

The Main Street Well Field is located in the City of Elkhart, Indiana, just north of Crawford Street and west of North Main Street (Figure 1). The well field, owned and operated by the Elkhart Water Works, consists of 15 production wells that supply approximately 70 percent of the system's production capacity. Christiana Creek flows through recharge ponds within the well field boundaries. The 48 acre well field has a park-like environment and is readily accessible to the public.

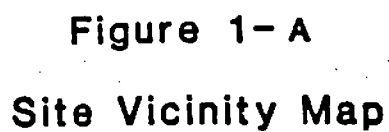
Main Street Well Field groundwater has been contaminated with volatile organic compounds (VOCs) including trichloroethylene; 1,1,1-trichloroethane; 1,1-dichloroethylene; 1,1-dichloroethane; 1,2-dichloroethane; cis- and trans-1,2 dichloroethylene; and tetrachloroethylene.

The U.S. EPA first detected VOCs in the Main Street Well Field finished water in April 1981. Since the discovery of the VOC contamination, groundwater has been monitored to define and track the extent of contamination. Further study in 1981 by the Indiana State Board of Health (ISBH) and the City of Elkhart determined that extensive groundwater contamination exists to the east of well field. Two interceptor wells, installed in 1981 on the eastern side of the well field, have reduced VOC contamination levels in the eastern-most production wells. In 1982 and 1983, several independent studies performed by industries in the area confirmed the existence of a contamination source to the east of the well field.

Recently, analyses of soil and groundwater by the Indiana State Board of Health, City of Elkhart and the Elkhart County Health Department also indicated that potential sources of VOC contamination are located west of the well field. Analytical results from the EPA Phase I RI (1986-1987) activities revealed groundwater contamination present west of the well field. Contamination detected on the west side contain different constituents than found on the east side of the well field.

FIGURE 1-A

SITE VICINITY MAP



Currently, all 15 production wells in the Main Street Well Field show measurable levels of trichloroethylene; eight of these wells show concentrations in excess of 2.8 ppb, which is the 1×10^{-6} U.S. EPA Cancer Assessment Group risk level.

In March and April of 1985, the U.S. EPA sampled all production wells and analyzed these samples for volatile and non-volatile organic priority pollutant compounds, pesticides, polychlorinated biphenyls (PCB), metals, cyanide and mercury. Analytical results indicated that the groundwater contamination was limited to VOCs.

In October and November of 1986, eight monitoring wells were installed in and around the Main Street Well Field. Preliminary review of groundwater samples taken during well installation indicated VOC contamination in the upper portion of the unconfined aquifer. Samples of existing observation, production, and residential wells taken during the same period also indicate primarily VOC contamination of groundwater.

1.1 Geologic Setting

During the last glacial period, the St. Joseph River Basin Region was part of a much larger drainage system that carried glacial melt water as the ice receded. The present-day St. Joseph River is the result of this earlier drainage path (USGS, 1981). The fast flowing waters deposited layers of sands and gravels, and the slower moving and standing water deposited silts and clays. Depth to the bedrock shale underlying these deposits ranges from 85 feet to 500 feet. In the area of the well field, the bedrock is 150 to 200 feet below the surface. A bedrock valley runs underneath the Elkhart Municipal Airport, north to Christiana Lake (Cass County, Michigan) and south to the St. Joseph River.

The aquifer system in northwest Elkhart County consists of coarse sand and gravel deposits with an average thickness of 175 feet. A layer of silt and clay with a thickness averaging 20 feet is interbedded in the sand and gravel. In the area of Main Street Well Field, there is no confined

aquifer (USGS, 1981); the clay and silt are believed to have been deposited directly on the bedrock surface. In this area, the single (unconfined) aquifer is approximately 40 feet thick.

The soil at the Main Street Well Field site is Oshtemo loamy sand to depths of about 14 inches. The soil is described as a deep, well-drained soil on glacial outwash with an estimated permeability of 0.04 cm/sec. Sand and gravel (glacial outwash) occurs to depths ranging from 38 to 70 feet. The permeability of the aquifer ranges from 0.08 to 0.18 cm/sec. Below the sand and gravel layer, there is a silt and clay layer, which is believed to slope to the west. At the present time, insufficient data exist to determine the thickness of this layer. The clay and silt layer has an estimated permeability of 1.6×10^{-7} cm/sec (USGS, 1981).

BARNES & THORNBURG

600 1st Source Bank Center (E)
100 North Michigan
South Bend, Indiana 46601
(219) 233-1171

To Call Writer

TWX 810-341-3427 B&T LAW IND
Telecopier (219) 237-1125

June 30, 1988

CERTIFIED MAIL P 799 487 251
RETURN RECEIPT REQUESTED

Freedom of Information Office
United States Environmental Protection Agency
Washington, D.C. 20460

Dear Freedom of Information Officer:

This letter requests copies of the documents described below pursuant to the Freedom of Information Act, 5 U.S.C. § 552 and EPA's Regulations on Public Information, 40 C.F.R. Part II.

We are seeking documents maintained by the U.S. E.P.A. concerning the following facilities/individuals located in Elkhart, Indiana:

Himco Landfill
County Road 10 Landfill
Charles Himes
Himco Waste-Away Services, Inc.

We request that you provide the following documents:

1. All documents discussing or relating to the Site regarding compliance with the Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq.) including, but not limited to, notification forms, permit applications, inspection reports, complaints, notices of violation, consent decrees, and analytical reports.
2. All documents discussing or relating to the Site regarding compliance with the Water Pollution Control Act (33 U.S.C. § 1251 et seq.) including, but not limited to, permit

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applications, and section reports, trip reports, hydrogeologic reports, complaints, notices of violation, consent decrees, and analytical results.

3. All documents discussing or relating to the Site regarding compliance with the Clean Air Act (42 U.S.C. 7401 et seq.) including, but not limited to, permit applications, inspection reports, trip reports, complaints, notices of violations, consent decrees and analytical reports.
4. All documents discussing or relating to the Site regarding compliance with the Toxic Substance Control Act (15 U.S.C. 2601 et seq.) including, but not limited to, permit applications, inspection reports, trip reports, complaints, notices of violation, consent decrees, and analytical results.
5. All documents discussing or relating to the Site regarding compliance with the Comprehensive Environmental Response, Compensation Liability Act (42 U.S.C. § 9601 et seq.).

Please inform us of the cost of reproducing these documents and we will promptly forward payment to you. If the Agency chooses not to produce any documents responsive to this request on the basis of a claimed privilege or any other reason, then, for each document not produced, please list the document and its date, describe its contents with reasonable particularity, and state how the claimed privilege or other basis for not producing the document justifies non-disclosure.

Thank you for your cooperation in this matter.

Very truly yours,

BARNES & THORNBURG

Julie S. Canniff
Legal Assistant

JSC:jg
bcc: Richard Paulen, Esq. ✓
Douglas D. Small, Esq.
Charles V. Sweeney, Esq.
8559J

BARNES & THORNBURG

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June 30, 1988

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RETURN RECEIPT REQUESTED

United State Environmental Protection Agency
Region V
230 South Dearborn Street
Chicago, Illinois 60604

Dear Freedom of Information Officer:

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5. All documents discussing or relating to the Site regarding compliance with the Comprehensive Environmental Response, Compensation Liability Act (42 U.S.C. § 9601 et seq.).

Members from our office would like to examine the dockets personally at your office. We will be in touch with you to set up an appointment.

Please inform us of the cost of reproducing these documents and we will promptly forward payment to you. If the Agency chooses not to produce any documents responsive to this request on the basis of a claimed privilege or any other reason, then, for each document not produced, please list the document and its date, describe its contents with reasonable particularity, and state how the claimed privilege or other basis for not producing the document justifies non-disclosure.

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Very truly yours,

BARNES & THORNBURG

Julie S. Canniff
Legal Assistant

JSC:jg

bcc: Richard W. Paulen, Esq. ✓
Douglas D. Small, Esq.
Charles V. Sweeney, Esq.

8554J

BARNES & THORNBURG

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Y

Facility name: C.R. 10 Landfill (a.k.a. Himco Dump)

Location: County Road 10, Elkhart County, Indiana

EPA Region: V

Person(s) in charge of the facility: _____

Name of Reviewer: _____ Date: _____

General description of the facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

The site is a landfill located north of Elkhart, Indiana. The
area was previously a low-lying marshland. The site was operated
from 1960 to 1977 and accepted municipal, medical, and industrial
wastes.

Scores: $S_M = 39.50$ ($S_{gw} = 68.21$ $S_{sw} = 4.13$ $S_a = 0$)

$S_{FE} = 0$

$S_{DC} = 0$

FIGURE 1
HRS COVER SHEET

Ground Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)	
1 Observed Release	0 45	1	0	45	3.1	
If observed release is given a score of 45, proceed to line 4 . If observed release is given a score of 0, proceed to line 2 .						
2 Route Characteristics					3.2	
Depth to Aquifer of Concern	0 1 2 3	2	6	6		
Net Precipitation	0 1 2 3	1	2	3		
Permeability of the Unsaturated Zone	0 1 2 3	1	3	3		
Physical State	0 1 2 3	1	3	3		
Total Route Characteristics Score			14	15		
3 Containment	0 1 2 3	1	3	3	3.3	
4 Waste Characteristics					3.4	
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	1	8		
Total Waste Characteristics Score			19	26		
5 Targets					3.5	
Ground Water Use	0 1 2 3	3	9	9		
Distance to Nearest Well/Population Served	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	40	40		
Total Targets Score			49	49		
6 If line 1 is 45, multiply 1 x 4 x 5						
If line 1 is 0, multiply 2 x 3 x 4 x 5			39,102	57,330		
7 Divide line 6 by 57,330 and multiply by 100			S _{gw} = 68.21			

FIGURE 2
GROUND WATER ROUTE WORK SHEET

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)	
[1] Observed Release	0 45	1	0	45	4.1	
If observed release is given a value of 45, proceed to line [4]. If observed release is given a value of 0, proceed to line [2].						
[2] Route Characteristics					4.2	
Facility Slope and Intervening Terrain	0 1 2 3	1	0	3		
1-yr. 24-hr. Rainfall	0 1 2 3	1	2	3		
Distance to Nearest Surface Water	0 1 2 3	2	4	6		
Physical State	0 1 2 3	1	1	3		
Total Route Characteristics Score			7	15		
[3] Containment	0 1 2 3	1	2	3	4.3	
[4] Waste Characteristics					4.4	
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	1	8		
Total Waste Characteristics Score			19	26		
[5] Targets					4.5	
Surface Water Use	0 1 2 3	3	6	9		
Distance to a Sensitive Environment	0 1 2 3	2	4	6		
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40		
Total Targets Score			10	55		
[6] If line [1] is 45, multiply [1] x [4] x [5]						
If line [1] is 0, multiply [2] x [3] x [4] x [5]			2660	64,350		
[7] Divide line [6] by 64,350 and multiply by 100			S _{sw} = 4.13			

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

Reemill
2/4/86

Air Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1	0	45	5.1
Date and Location:					
Sampling Protocol:					
If line 1 is 0, the S_a = 0. Enter on line 5 . If line 1 is 45, then proceed to line 2 .					
2 Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				20	20
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
Total Targets Score				39	
4 Multiply 1 x 2 x 3			0	35,100	
5 Divide line 4 by 35,100 and multiply by 100 $S_a = 0$					

FIGURE 9
AIR ROUTE WORK SHEET

Shunell
2/4/82

Fire and Explosion Work Sheet - No Threat Indicated							
Rating Factor	Assigned Value (Circle One)		Multi- plier	Score	Max. Score	Ref. (Section)	
1 Containment	1	3	1		3	7.1	
2 Waste Characteristics						7.2	
Direct Evidence	0	3	1		3		
Ignitability	0	1 2 3	1		3		
Reactivity	0	1 2 3	1		3		
Incompatibility	0	1 2 3	1		3		
Hazardous Waste Quantity	0	1 2 3 4 5 6 7 8	1		8		
Total Waste Characteristics Score					20		
3 Targets						7.3	
Distance to Nearest Population	0	1 2 3 4 5	1		5		
Distance to Nearest Building	0	1 2 3	1		3		
Distance to Sensitive Environment	0	1 2 3	1		3		
Land Use	0	1 2 3	1		3		
Population Within 2-Mile Radius	0	1 2 3 4 5	1		5		
Buildings Within 2-Mile Radius	0	1 2 3 4 5	1		5		
Total Targets Score					24		
4 Multiply 1 x 2 x 3					1,440		
5 Divide line 4 by 1,440 and multiply by 100				SFE = 0			

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

Shinnell
2/4/86

NO THREAT INDICATED

Direct Contact Work Sheet						
Rating Factor	Assigned Value (Circle One)		Multi- plier	Score	Max. Score	Ref. (Section)
1 Observed Incident	0	45	1		45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2						
2 Accessibility	0	1 2 3	1		3	8.2
3 Containment	0	15	1		15	8.3
4 Waste Characteristics Toxicity	0	1 2 3	5		15	8.4
5 Targets						8.5
Population Within a 1-Mile Radius	0	1 2 3 4 5	4		20	
Distance to a Critical Habitat	0	1 2 3	4		12	
Total Targets Score					32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5					21,600	
7 Divide line 6 by 21,600 and multiply by 100				SDC = 0		

FIGURE 12
DIRECT CONTACT WORK SHEET

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Drumell
2/4/86

	s	s ²
Groundwater Route Score (S _{gw})	68.21	4,652.60
Surface Water Route Score (S _{sw})	(from original) 4.13	17.06
Air Route Score (S _a)	(from original) 0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		4,669.66
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		68.33
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		39.50

FIGURE 10
WORKSHEET FOR COMPUTING S_M

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: C.R. 10 Landfill (a.k.a. Himco Dump)

LOCATION: Elkhart County, Indiana

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

N/A

Rationale for attributing the contaminants to the facility:

N/A

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern: The aquifer of concern consists of outwash materials mainly composed of sand and gravel. In some areas, these materials are separated into two aquifer systems by a silt and clay bed. This bed acts as a confining layer for the lower portion of the aquifer system. The saturated thickness of this system ranges from 85 to 500 feet. The confining layer is not present beneath the landfill (Ref.3, p.1).

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern: The area was originally a lowland/swamp prior to filling activities (Ref.3, p.5). Wells installed through a USGS investigation effort were screened in the shallow aquifer at 24 feet on site - Wells M-1 and P (Ref.3, p.88). USGS topographic sheets indicate that the elevation of the landfill is 760 feet AMSL (Ref.6). USGS groundwater investigation data indicates that the top of the saturated zone is at 755 feet AMSL (Ref.3, p.28).

Depth from the ground surface to the lowest point of waste disposal/storage:

760 feet - 755 feet = 5 feet

The depth to the aquifer of concern is 5 feet which correlates to a factor of 3. (Ref 2, 47 FR 31224).

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

Mean annual precipitation for this area is approximately 34 inches.
(Ref.2, 47 FR 31224).

Mean annual lake or seasonal evaporation (list months for seasonal):

Mean annual lake evaporation for this area is approximately 31 inches.
(Ref 2, 47 FR 31224).

Net precipitation (subtract the above figures):

Precipitation (34 inches) minus Evaporation (31 inches) = Net precipitation 3 inches
The factor for 3 inches net precipitation is 2 (Ref.2, 47 FR 31224)

Permeability of Unsaturated Zone

Soil type in unsaturated zone: Soils consist of silty sands developed on these outwash plains. The soil applied as final cover over the filled area was also sandy in nature (Ref.3).

Permeability associated with soil type: The permeability associated with sandy soils and the highly conductive sand and gravel outwash is 10^{-5} cm/sec or greater. The factor for permeability is 3 (Ref.2, 47 FR 31224).

Physical State

Physical state of substances at time of disposal (or at present time for generated gases): The wastes disposed of at this location consisted of solids and liquids (Ref.9). No oily liquid wastes were accepted. The value for the physical state of wastes is 3 (Ref.2, 47 FR 31229).

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

No containment feature such as liner or leachate collection system.

Method with highest score:

Landfill with no liner.

Containment value is 3 (Ref.2, 47 FR 31229)

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated: If wastes containing heavy metals were to have been accepted at this site, the toxicity/persistence matrix value would be 18. As presented in the original package, this is not properly supported since the observed release is not considered appropriate.

Compound with highest score:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

(SEE ORIGINAL SHEETS)

1

Basis of estimating and/or computing waste quantity:

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated: *N/A*

Method with highest score: *N/A*

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:	TOXICITY	PERSISTENCE	MATRIX VALUE
Cobalt	1 (REF 12 P. 509)	3 (REF 2 47FR31219)	12
Barium	3 (ref 12 p398)	3 "	18
Arsenic	3 (ref 12 p388)	3 "	18
Cadmium	3 (ref 12 p456)	3 (")	18

Compound with highest score: *Ref*

Ref Barium, arsenic and cadmium all have a matrix score of 18. Presence indicated in Reference 1. *Kfy*

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

UNKNOWN - ASSUME 1 REF 15 P. 3. NOTE: SITE COVERS ~40 ACRES. HOWEVER THE ONLY LIST OF WASTE AVAILABLE SHOWS PHARMACEUTICAL OR MEDICAL WASTE WITHOUT SIGNIFICANT QUANTITIES OF HAZARDOUS WASTE.

Basis of estimating and/or computing waste quantity:

SINCE DOCUMENTED INFO ON HAZARDOUS WASTE QUANTITY IS NOT AVAILABLE (IE. "UNKNOWN") AND THE VOLUME OF THE LANDFILL CANNOT BE USED FOR TOTAL QUANTITY, 1 IS THE ASSUMED VALUE FOR THE UNKNOWN QUANTITY OF WASTE. REF 15 P. 3. Also, since contaminants ** were found immediately downgradient of the site at levels significantly higher than upgradient, the waste quantity value is justified at one. *Jfy* *Drumell* 2/4/16

(SEE ORIGINAL SHEETS)

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

3

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

Distance to above well or building:

4

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

Total population served by ground water within a 3-mile radius:

5

4*5 → 40 pop/dist matrix score

5 TARGETS

Russell
2/4/86

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:
Sole Source for drinking water. Ref 4, Ref 5. The unthreatened South Well Field does not have the capacity of serving the total population served currently by all 3 well fields. Should the Power and North Main Street Well Fields become contaminated. Ref 4. See Ref 6 for locations of well fields. *Zfy*

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

Mr. Goss Residence - drinking water well (Ref 7)
No access to municipal water since he is west of the boundary of the city which is the extent of the distribution (Ref 6, 18).
Address: 27991 CR 10 West (Ref 7 & see topo Ref 6)

Distance to above well or building:

Based on calculation made from Ref 6 (topo) and aerial photograph (Ref 22) the distance from Mr Goss' residence to the nearest contaminated monitoring well is 199.7 ft. (Ref 22) *Zfy*

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each: All of the wells in the area are in the outwash aquifer (Ref 16). 2 Elkhart water works wells are located within the 3 mile radius. (Ref 6) Water from all 3 well fields serving Elkhart is used throughout the entire distribution system, mixing where they meet in the system (Ref 4, 20, 21). A total of 13,488 accounts are served, 11863 of which are residences. (Ref 21) In addition, 3% of Elkhart residents don't have access to city water. (Ref 21) People outside the distribution use private wells in this outwash (Ref 3 p 1, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100).
Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

No information is available on the amount of land irrigated by groundwater within a 3 mile radius. (Ref 5) Since however as shown below the population served by groundwater for drinking is well over 10,000, this information ~~is not~~ *Zfy*
~~needed~~ would not change this factor value.

Total population served by ground water within a 3-mile radius:

11,683 residences served by Elkhart Water Works (Ref 21)
x 3.8 people per residence

44395.4 people in residences served by Elkhart Water.

Even if the ~20% of residences served by the South well field is subtracted a value of 35,516.32 people are still served by the threatened water sources. (Ref 21). Since this number is well over the 10,000 needed for a maximum HRS score, a house count of private wells in the same aquifer is unnecessary. *Zfy* *Attendant*

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum): *NONE*

Rationale for attributing the contaminants to the facility: *N/A*

* * *

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent: *THE AVERAGE TERRAIN SLOPE IS 1 TO 5% TO THE SOUTH. HOWEVER, THE SITE ITSELF SLOPES GENTLY (~2%) TO THE NORTH TOWARD AN UNNAMED TRIBUTARY TO OSBORN CREEK. REF # PART 5 SEC VI 14*

Name/description of nearest downslope surface water: *AN UNNAMED CREEK ALONG THE NORTH BENCH OF THE SITE IS THE NEAREST DOWNSLOPE SURFACE WATER. THIS CREEK FLOWS THROUGH A MARSHY AREA AND INTO OSBORN CREEK. OSBORN CREEK IS A TRIBUTARY OF THE ST JOSEPH RIVER. REF # PART 5 SEC VI ALSO SEE REF 6.*

Average slope of terrain between facility and above-cited surface water body in percent: *2% REF # PART 5 SEC VI OR ALSO SEE REF 6 NOTE THAT THE AVERAGE SLOPE OF FACILITY IS 1 TO 5% TO THE SOUTH. THE ABOVE INFORMATION IS NOT EASILY OBVIOUS ON THE TOPS BECAUSE OF THE QUADRANGLE'S AGE (1969) AND THE LACK OF A SUBSEQUENT PHOTO REVISION REF 6*

Is the facility located either totally or partially in surface water?

NO. HOWEVER, AS STATED IN THE GENERAL DESCRIPTION THE FACILITY IS A FORMER SWAMPY AREA THAT WAS EXCAVATED AND FILLED IN REF # PART 5 SEC VI

*Drumrell
2/4/86*

Is the facility completely surrounded by areas of higher elevation?

No. REF 6

1-Year 24-Hour Rainfall in Inches $2\frac{1}{4}"$ REF 2 (47FR 31233)

ELKHART IS SITUATED BETWEEN THE $2"$ AND $2\frac{1}{2}"$ 1-YEAR
24 HOUR RAINFALL RANGE $2" + 2\frac{1}{2}" = 4\frac{1}{2}"$ $4\frac{1}{2}" \div 2 = 2\frac{1}{4}"$

Distance to Nearest Downslope Surface Water SEE ALSO ATTACHED PAGE 7A

The distance from the site following the most likely
path of water flow to the nearest downslope surface
water that is not intermittent is 4876 ft or
.92 miles (Ref 6) Zfy

Physical State of Waste SOLID REF 9 P. 1

Mr. Himes stated that only solids were accepted
at his landfill (Ref 9 p1) Mr. Bruce Carter of
Hiles Laboratories stated that liquids and solids
were sent to Himco but no specific reference of a
hazardous liquid was available. (Ref 9 p2) Zfy

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated: LANDFILL WITH
SAND COVER AND VISIBLE LEACHATE STREAMS,
REF 9 P. 1 AND P. 2., REF 8.

Method with highest score: LANDFILL IS NOT ADEQUATELY
COVERED AND LEACHATE STREAMS VISIBLE. SITE PHOTOGRAPHS
TAKEN DURING THE EOE SITE INSPECTION (REF. 8) SHOW THAT A
SECOND DIVERSION SYSTEM DOES NOT EXIST. THE ABOVE
PHOTOS ARE AVAILABLE FOR VIEWING IN THE EOE
CHICAGO OFFICE FILES. REF 9 P. 1 AND P. 2. THIS PLACES
THE SITE BETWEEN A MATRIX VALUE OF 1 (INADEQUATELY
COVERED) AND 3 (NO DIVERSION SYSTEM PRESENT). I ASSIGN
THE SITE A VALUE OF 2 TO REFLECT THIS STATUS.
REF 2 (47FR 31236)

NRussell
2/4/92

Distance to Nearest Surface Water

Specific records of exact locations of buried waste on the Himco Site are not available. As waste was brought in, the marshy land was filled in; then covered. At the center of the site the elevation is built up 15 ft and along the perimeter it is 5 ft higher than the original ground level. (Ref 3 p 5) This would indicate that waste may have been deposited all over the total 40 acres. Many areas of stressed vegetation exist on site (Ref 9 p 2, Ref 8 p 18-2). Leachate accumulations (calcium sulfate) were observed scattered throughout the site. (Ref 9 p 2) Calcium sulfate was also observed on top of the site at the north end (Ref 9 p 2). Methane & sulfate odors were also observed throughout the site. (Ref 9 p 2) All these observations support that waste has been buried in several locations all over the site. Since exact waste pockets cannot be identified, distance to surface water will be measured from the center of the site rather than the site perimeter.

Measuring from the center of the site to the ditch at the northwest corner, thru the wetland into Manning ditch south to Osborne Creek to where it empties into the St. Joseph River is 6.875 (6 ⁷/₈) inches. This equals 13750 ft.
2.60 miles (Ref 6)

The distance to Osborne Creek where it is not intermittent is 2 ⁷/₁₆ inches. This equals 4876 or .92 miles (Ref 6)

Kathleen & Letty

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated COPALS WAS FOUND IN DOWNGRADIENT
GROUND WATER SAMPLES. SEE GROUND WATER ROUTE
WASTE CHARACTERISTICS. REF #1
Barium, Arsenic & Cadmium also found downgradient with
Matrix score of 18

Compound with highest score: TOXICITY - PERSISTENCE MATRIX VAL

COPALS	1 (REF 12, P. 509)	3 (REF 2 (47FR 31229))	12
Barium	3 (REF 12, P. 398)	3 "	18
Arsenic	3 (REF 12, P. 388)	3 "	18
RAIM Cadmium	3 (REF 12, P. 456)	3 "	18

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those
with a containment score of 0 (Give a reasonable estimate even if
quantity is above maximum):

UNKNOWN. ASSUME 1 REF # 2 (47FR 31234) AND
REF 15 P 3.

Basis of estimating and/or computing waste quantity:

SEE GROUND WATER HAZARDOUS WASTE QUANTITY SECTION

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous
substance: Please see page 7A of this documentation package

Measuring from the center of the site to the ditch at
the northwest corner of the site, through the adjacent
wetland to Manning Ditch (which drains the wetland)
then measuring Manning Ditch south into Osborne
Creek which empties into St. Joseph River is a
total of ~ 2.60 miles (Ref 6) The use of the
St. Joseph River is recreation (Ref 10, 14, 23)

Spunell
2/4/82

Is there tidal influence?

NO. REF 6

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less: N/A

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

A marshy area is located to the immediate north west of the site. It is approximately 1000ft from the site and roughly square in shape with ~1500ft sides $(1500ft)^2 = 2250000 ft^2 \div 43560 ft^2/acre = 51.65 acres$. REF 6.

Surface runoff can reach this wetland (even though REF 6 shows the site and the wetland at the same elevation) since the landfill itself was built up ~15ft higher than the original level of the wetland. REF 3 page 5.

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

UNKNOWN, BUT THE INDIANA BAT MAY BE PRESENT IN THE GENERAL AREA. REF 11.

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

NONE. ALL RESIDENTS IN 3 MILE DOWNSTREAM AREA ARE ON GROUND WATER. REF 4

SRussell
2/4/82

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

NONE REF 14

Total population served: 0. NO SURFACE WATER
INTAKES EXIST WITHIN 3 MILES DOWNSTREAM OF
SITE. REF 6 AND REF 4.

Name/description of nearest of above water bodies:

N/A

Distance to above-cited intakes, measured in stream miles. N/A

SRussell
2/4/82

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected: *NONE*

Date and location of detection of contaminants *N/A*

Methods used to detect the contaminants: *N/A*

Rationale for attributing the contaminants to the site: *N/A*

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound: *N/A*

Most incompatible pair of compounds: *N/A*

SRussell
2/4/86

FIRE AND EXPLOSION

1 CONTAINMENT

Hazardous substances present: A CERTIFIED DOCUMENT FROM THE STATE OR LOCAL FIRE MARSHAL STATING THAT A SIGNIFICANT FIRE HAZARD OR EXPLOSION THREAT EXISTS AT THIS SITE DOES NOT EXIST. DOCUMENTATION IN THE E&E HAS FOLDER DOES NOT INDICATE THAT SUCH HAZARDS ARE LIKELY TO EXIST AT THIS SITE.

Type of containment, if applicable:

N/A

2 WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

N/A

Ignitability

Compound used:

N/A

Reactivity

Most reactive compound:

N/A

Incompatibility

Most incompatible pair of compounds:

N/A

J Russell
2/4/86

DIRECT CONTACT

No Direct Contact Threat indicated.

1 OBSERVED INCIDENT

Kfy

Date, location, and pertinent details of incident:

2 ACCESSIBILITY

Describe type of barrier(s):

3 CONTAINMENT

Type of containment, if applicable:

4 WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

Compound with highest score:

SRussell
2/4/86

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

Well D-1
up-gradient

84MA68545
EPA Sample No.

ME3201

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL

CASE NO. 3104

QC REPORT NO. 5471

Elements Identified and Measured

Matrix WATER

(ug/L) or mg/kg (Circle One)

RECEIVED SEP 27 1988

1. Aluminum <u>12,500</u> (P)	13. Magnesium NR (P)
2. Antimony <u><20</u> (F)	14. Manganese <u>1630</u> (P)
3. Arsenic <u>26</u> (F)	15. Mercury <u>0.21</u> (P)
4. Barium <u>121</u> (P)	16. Nickel <u>103</u> (P)
5. Beryllium <u><5</u> (P)	17. Potassium NR (P)
6. Cadmium <u><1</u> (P or <u>(F)</u>)	18. Selenium <u><2</u> (F)
7. Calcium NR (P)	19. Silver <u><10</u> (P)
8. Chromium <u>370</u> (P)	20. Sodium NR (P)
9. Cobalt <u><50</u> (P)	21. Thallium <u><10</u> (F)
10. Copper <u>73</u> (P)	22. Tin <u><20</u> (P)
11. Iron <u>67,400</u> (P)	23. Vanadium <u><200</u> (P)
12. Lead <u>73</u> (<u>(P)</u> or F)	24. Zinc <u>164</u> (P)
Cyanide <u><10</u>	Percent Solids NR

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: _____

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

Well E-2
down-gradient

84MA08549

EPA Sample No.

ME3205

Date

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL

CASE NO. 3104

LAB SAMPLE ID. NO. _____

QC REPORT NO. 5475

Elements Identified and Measured

Matrix Water

(ug/L) or mg/kg (Circle One) RECEIVED SEP 27 1981

1. Aluminum <u>350000</u> (P)	13. Magnesium NR
2. Antimony <u><20</u> (F)	14. Manganese <u>2150</u> (P)
3. Arsenic <u>200</u> (F)	15. Mercury <u>1.4</u> (CV)
4. Barium <u>803</u> (P)	16. Nickel <u>422</u> (P)
5. Beryllium <u>11</u> (P)	17. Potassium NR
6. Cadmium <u>10</u> (P) or (F)	18. Selenium <u>14</u> (F)
7. Calcium NR	19. Silver <u><10</u> (F)
8. Chromium <u>461</u> (P)	20. Sodium NR
9. Cobalt <u>132</u> (P)	21. Thallium <u><10</u> (F)
10. Copper <u>555</u> (P)	22. Tin <u><20</u> (F)
11. Iron <u>146000</u> (P)	23. Vanadium <u>326</u> (F)
12. Lead <u>401</u> (P) or (F)	24. Zinc <u>1630</u> (F)
Cyanide <u><10</u>	Percent Solids NR

Footnotes: For reporting results to EPA, standard result qualifiers are as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explained and contained on Cover Page, however.

Comments: _____

Well P
on site

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

84MA08546

EPA Sample No.

ME3202

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL

CASE NO. 3104

QC REPORT NO. 5471

Elements Identified and Measured

Matrix WATER

ug/L or mg/kg (Circle One) RECEIVED SEP 27 1984

1. Aluminum	175	(P)	13. Magnesium	NR	(P)
2. Antimony	<20	(F)	14. Manganese	182	(P)
3. Arsenic	26	(F)	15. Mercury	<0.2	(P)
4. Barium	97	(P)	16. Nickel	<40	(P)
5. Beryllium	<5	(P)	17. Potassium	NR	(P)
6. Cadmium	<1	(P or (F))	18. Selenium	4.7	(F)
7. Calcium	NR	(P)	19. Silver	<10	(P)
8. Chromium	<10	(P)	20. Sodium	NR	(P)
9. Cobalt	<50	(P)	21. Thallium	<10	(F)
10. Copper	<50	(P)	22. Tin	<20	(P)
11. Iron	11400	(P)	23. Vanadium	<200	(P)
12. Lead	6.7	(P or (F))	24. Zinc	58	(P)
Cyanide	<10		Percent Solids	NR	

Footnotes: For reporting results to EPA, standard result qualifiers are used defined on Cover Page. Additional flags or footnotes explain results are encouraged. Definition of such flags must be explained and contained on Cover Page, however.

Comments: _____

Well M
onsite

84MA 08 547

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

EPA Sample No.

ME 3203

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL

CASE NO. 3104

QC REPORT NO. 5475

RECEIVED 5 27 1984

Matrix Water

Elements Identified and Measured

(ug/L or mg/kg (Circle One))

1. <u>Aluminum</u> <u>296</u> (P)	13. <u>Magnesium</u> <u>NR</u> (P)
2. <u>Antimony</u> <u><20</u> (F)	14. <u>Manganese</u> <u>331</u> (P)
3. <u>Arsenic</u> <u><10</u> (F)	15. <u>Mercury</u> <u><0.2</u> (P)
4. <u>Barium</u> <u>172</u> (P)	16. <u>Nickel</u> <u><40</u> (P)
5. <u>Beryllium</u> <u><5</u> (P)	17. <u>Potassium</u> <u>NR</u> (P)
6. <u>Cadmium</u> <u><1</u> (P or (F))	18. <u>Selenium</u> <u><2</u> (F)
7. <u>Calcium</u> <u>NR</u> (P)	19. <u>Silver</u> <u><10</u> (P)
8. <u>Chromium</u> <u>16</u> (P)	20. <u>Sodium</u> <u>NR</u> (P)
9. <u>Cobalt</u> <u><50</u> (P)	21. <u>Thallium</u> <u><10</u> (F)
10. <u>Copper</u> <u><50</u> (P)	22. <u>Tin</u> <u><20</u> (P) B
11. <u>Iron</u> <u>12300</u> (P)	23. <u>Vanadium</u> <u><200</u> (P)
12. <u>Lead</u> <u>7.7</u> (P or (F))	24. <u>Zinc</u> <u>224</u> (P)
<u>Cyanide</u> <u><10</u>	<u>Percent Solids</u> <u>NR</u>

Footnotes: For reporting results to EPA, standard result qualifiers are used defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: _____

Facility name: C.R. 10 Landfill (a.k.a. Himco Dump)

Location: County Road 10, Elkhart County, Indiana

EPA Region: V

Person(s) in charge of the facility: _____

Name of Reviewer: _____ Date: _____

General description of the facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

The site is a landfill located north of Elkhart, Indiana. The
area was previously a low-lying marshland. The site was operated
from 1960 to 1977 and accepted municipal, medical, and industrial
wastes.

Scores: $S_M = 31.47$ $S_{GW} = 54.28$ $S_{SW} = 4.13$ $S_a = 0$)

$S_{FE} = 0$

$S_{DC} = 0$

FIGURE 1
HRS COVER SHEET

Ground Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)	
1 Observed Release	0 45	1	0	45	3.1	
If observed release is given a score of 45, proceed to line 4 . If observed release is given a score of 0, proceed to line 2 .						
2 Route Characteristics					3.2	
Depth to Aquifer of Concern	0 1 2 3	2	6	6		
Net Precipitation	0 1 2 3	1	2	3		
Permeability of the Unsaturated Zone	0 1 2 3	1	3	3		
Physical State	0 1 2 3	1	3	3		
Total Route Characteristics Score			14	15		
3 Containment	0 1 2 3	1	3	3	3.3	
4 Waste Characteristics					3.4	
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	1	8		
Total Waste Characteristics Score			19	26		
5 Targets					3.5	
Ground Water Use	0 1 2 3	3	9	9		
Distance to Nearest Well/Population Served	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	30	40		
Total Targets Score			39	49		
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			31,122	57,330		
7 Divide line 6 by 57,330 and multiply by 100			$S_{gw} = 54.28$			

FIGURE 2
GROUND WATER ROUTE WORK SHEET

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Rel. (Section)	
1 Observed Release	0 45	1	0	45	4.1	
If observed release is given a value of 45, proceed to line 4 . If observed release is given a value of 0, proceed to line 2 .						
2 Route Characteristics					4.2	
Facility Slope and Intervening Terrain	0 1 2 3	1	0	3		
1-yr. 24-hr. Rainfall	0 1 2 3	1	2	3		
Distance to Nearest Surface Water	0 1 2 3	2	4	6		
Physical State	0 1 2 3	1	1	3		
Total Route Characteristics Score			7	15		
3 Containment	0 1 2 3	1	2	3	4.3	
4 Waste Characteristics					4.4	
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	1	8		
Total Waste Characteristics Score			19	26		
5 Targets					4.5	
Surface Water Use	0 1 2 3	3	6	9		
Distance to a Sensitive Environment	0 1 2 3	2	4	6		
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40		
Total Targets Score			10	55		
If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			2660	64,350		
7 Divide line 6 by 64,350 and multiply by 100			S _{sw} - 4.13			

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

Greenhill
2/4/86

Air Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Rel. (Section)	
[1] Observed Release	0 45	1	○	45	5.1	
Date and Location:						
Sampling Protocol:						
If line [1] is 0, the $S_a = 0$. Enter on line [5] . If line [1] is 45, then proceed to line [2] .						
[2] Waste Characteristics					5.2	
Reactivity and Incompatibility	0 1 2 3	1		3		
Toxicity	0 1 2 3	3		9		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8		
Total Waste Characteristics Score				20	2.1	
[3] Targets					5.3	
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30		
Distance to Sensitive Environment	0 1 2 3	2		6		
Land Use	0 1 2 3	1		3		
Total Targets Score				39		
[4] Multiply [1] × [2] × [3]			○	35,100		
[5] Divide line [4] by 35,100 and multiply by 100 $S_a =$ ○						

FIGURE 9
AIR ROUTE WORK SHEET

Munsell
2/4/82

Fire and Explosion Work Sheet - No Threat Indicated						
Rating Factor	Assigned Value (Circle One)		Multi-plier	Score	Max. Score	Ref. (Section)
1 Containment	1	3	1		3	7.1
2 Waste Characteristics						7.2
Direct Evidence	0	3	1		3	
Ignitability	0	1 2 3	1		3	
Reactivity	0	1 2 3	1		3	
Incompatibility	0	1 2 3	1		3	
Hazardous Waste Quantity	0	1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score					20	
3 Targets						7.3
Distance to Nearest Population	0	1 2 3 4 5	1		5	
Distance to Nearest Building	0	1 2 3	1		3	
Distance to Sensitive Environment	0	1 2 3	1		3	
Land Use	0	1 2 3	1		3	
Population Within 2-Mile Radius	0	1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0	1 2 3 4 5	1		5	
Total Targets Score					24	
4 Multiply 1 x 2 x 3					1,440	
5 Divide line 4 by 1,440 and multiply by 100 SFE = 0						

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

Shinnell
2/4/86

NO TREAT INDICATED

Direct Contact Work Sheet						
Rating Factor	Assigned Value (Circle One)		Multi- plier	Score	Max. Score	Ref. (Section)
1 Observed Incident	0	45	1		45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2						
2 Accessibility	0	1 2 3	1		3	8.2
3 Containment	0	15	1		15	8.3
4 Waste Characteristics Toxicity	0	1 2 3	5		15	8.4
5 Targets						8.5
Population Within a 1-Mile Radius	0	1 2 3 4 5	4		20	
Distance to a Critical Habitat	0	1 2 3	4		12	
Total Targets Score					32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5					21,600	
7 Divide line 6 by 21,600 and multiply by 100				SDC = 0		

FIGURE 12
DIRECT CONTACT WORK SHEET

Zfy

Drussell
2/4/86

	s	s ²
Groundwater Route Score (S _{gw})	54.28	2,946.32
Surface Water Route Score (S _{sw})	(from original) 4.13	17.06
Air Route Score (S _a)	(from original) 0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		2,963.38
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		54.28
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		31.38

FIGURE 10
WORKSHEET FOR COMPUTING S_M

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: C.R. 10 Landfill (a.k.a. Himco Dump)

LOCATION: Elkhart County, Indiana

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

N/A

Rationale for attributing the contaminants to the facility:

N/A

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern: The aquifer of concern consists of outwash materials mainly composed of sand and gravel. In some areas, these materials are separated into two aquifer systems by a silt and clay bed. This bed acts as a confining layer for the lower portion of the aquifer system. The saturated thickness of this system ranges from 85 to 500 feet. The confining layer is not present beneath the landfill (Ref.3, p.1).

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern: The area was originally a lowland/swamp prior to filling activities (Ref.3, p.5). Wells installed through a USGS investigation effort were screened in the shallow aquifer at 24 feet on site - Wells M-1 and P (Ref.3, p.88). USGS topographic sheets indicate that the elevation of the landfill is 760 feet AMSL (Ref.6). USGS groundwater investigation data indicates that the top of the saturated zone is at 755 feet AMSL (Ref.3, p.28).

Depth from the ground surface to the lowest point of waste disposal/storage:

760 feet - 755 feet = 5 feet

The depth to the aquifer of concern is 5 feet which correlates to a factor of 3. (Ref 2, 47 FR 31224).

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

Mean annual precipitation for this area is approximately 34 inches.
(Ref.2, 47 FR 31224).

Mean annual lake or seasonal evaporation (list months for seasonal):

Mean annual lake evaporation for this area is approximately 31 inches.
(Ref 2, 47 FR 31224).

Net precipitation (subtract the above figures):

Precipitation (34 inches) minus Evaporation (31 inches) = Net precipitation 3 inches
The factor for 3 inches net precipitation is 2 (Ref.2, 47 FR 31224)

Permeability of Unsaturated Zone

Soil type in unsaturated zone: Soils consist of silty sands developed on these outwash plains. The soil applied as final cover over the filled area was also sandy in nature (Ref.3).

Permeability associated with soil type: The permeability associated with sandy soils and the highly conductive sand and gravel outwash is 10^{-5} cm/sec or greater. The factor for permeability is 3 (Ref.2, 47 FR 31224).

Physical State

Physical state of substances at time of disposal (or at present time for generated gases): The wastes disposed of at this location consisted of solids and liquids (Ref.9). No oily liquid wastes were accepted. The value for the physical state of wastes is 3 (Ref.2, 47 FR 31229).

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

No containment feature such as liner or leachate collection system.

Method with highest score:

Landfill with no liner.

Containment value is 3 (Ref.2, 47 FR 31229)

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated: If wastes containing heavy metals were to have been accepted at this site, the toxicity/persistence matrix value would be 18. As presented in the original package, this is not properly supported since the observed release is not considered appropriate.

Compound with highest score:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

(SEE ORIGINAL SHEETS)

1

Basis of estimating and/or computing waste quantity:

* * *

3 CONTAINMENT

ContainmentMethod(s) of waste or leachate containment evaluated: *N/A*Method with highest score: *N/A*

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:	TOXICITY	PERSISTENCE	MATRIX VALUE
COBALT	1 (REF 12 P. 509)	3 (REF 2 47FR31219)	12
Barium	3 (ref 12 p398)	3 "	18
Arsenic	3 (ref 12 p388)	3 "	18
Cadmium	3 (ref 12 p456)	3 ("	18

Compound with highest score:

Presence indicated in Reference 1
REF Barium, arsenic and cadmium all have
a matrix score of 18

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

UNKNOWN - ASSUME 1 REF 15 P. 3 NOTE: SITE COVERS 40 ACRES. HOWEVER THE ONLY LIST OF WASTE AVAILABLE SHOWS PHARMACEUTICAL OR MEDICAL WASTE WITHOUT SIGNIFICANT QUANTITIES OF HAZARDOUS WASTE.

Basis of estimating and/or computing waste quantity:

SINCE DOCUMENTED INFO ON HAZARDOUS WASTE QUANTITY IS NOT AVAILABLE (I.E. "UNKNOWN") AND THE VOLUME OF THE LANDFILL CANNOT BE USED FOR TOTAL QUANTITY, 1 IS THE ASSUMED VALUE FOR THE UNKNOWN QUANTITY OF WASTE. REF 15 P. 3 ALSO, SINCE CONTAMINANTS ** WERE FOUND IMMEDIATELY DOWNGRADIENT OF THE SITE AT LEVELS SIGNIFICANTLY HIGHER THAN UPGRADIENT, ^{4A}THE WASTE QUANTITY VALUE IS JUSTIFIED AT ONE.

*Jfk**Drusell*
2/14/86

(SEE ORIGINAL SHEETS)

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

3

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

Bower Street wellfield of the City of Elkhart

Distance to above well or building:

Approximately 1.25 miles

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

Total population served by ground water within a 3-mile radius:

5

4*5 → 30 pop/dist matrix score

5 TARGETS

Russell
2/4/86

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:
Sole Source for drinking water. Ref 4, Ref 5. The unthreatened South Well Field does not have the capacity of serving the total population served currently by all 3 well fields. Should the Bower and North Main Street Well Fields become contaminated. Ref 4. See Ref 6 for locations of well fields. *ZFY*

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

~~Mr. Goss Residence - drinking water well (Ref 7)
No access to municipal water since he is west of the boundary of the city which is the extent of the distribution (Ref 6, 18)
Address: 27991 CR 10 West (Ref 7 & see topo Ref 6)~~

Distance to above well or building:

~~Based on calculation made from Ref 6 (topo) and aerial photograph (Ref 22) the distance from Mr Goss' residence to the nearest contaminated monitoring well is 199.7 ft. (Ref 22)~~ *ZFY*

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each: All of the wells in the area are in the outwash aquifer (Ref 16). 2 Elkhart water works wells are located within the 3 mile radius. (Ref 6) water from all 3 well fields serving Elkhart is used throughout the entire distribution system, mixing where they meet in the system (Ref 4, 20, 21). A total of 13,488 accounts are served, 11,863 of which are residences. (Ref 21) In addition, 30% of Elkhart residents don't have access to city water. (Ref 21) People outside the distribution use private wells in this outwash (Ref 3 p 1, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100).
Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

No information is available on the amount of land irrigated by groundwater within a 3 mile radius. (Ref 5) Since however as shown below the population served by groundwater for drinking is well over 10,000, this information ~~is not~~ *ZFY*
~~needed~~ would not change this factor value.

Total population served by ground water within a 3-mile radius:

11,683 residences served by Elkhart Water Works (Ref 21)
x 3.8 people per residence

44395.4 people in residences served by Elkhart Water.

Even if the ~20% of residences served by the South well field is subtracted a value of 35,516.32 people are still served by the threatened water sources.

(Ref 21). Since this number ^{5A} is well over the 10,000 needed for a maximum HRS score, a house count of private wells in the same aquifer is unnecessary. *ZFY* *Artisanal*

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum): *NONE*

Rationale for attributing the contaminants to the facility: *N/A*

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent: *THE AVERAGE TERRAIN SLOPE IS 1 TO 5% TO THE SOUTH. HOWEVER, THE SITE ITSELF SLOPES GENTLY (~2%) TO THE NORTH TOWARD AN UNNAMED TRIBUTARY TO OSBORN CREEK. REF 8 PART 5 SEC VII 14*

Name/description of nearest downslope surface water: *AN UNNAMED CREEK ALONG THE NORTH BORDER OF THE SITE IS THE NEAREST DOWNSLOPE SURFACE WATER. THIS CREEK FLOWS THROUGH A MARSHY AREA AND INTO OSBORN CREEK. OSBORN CREEK IS A TRIBUTARY OF THE ST JOSEPH RIVER. REF 8 PART 5 SEC VII ALSO SEE REF 6.*

Average slope of terrain between facility and above-cited surface water body in percent: *2% REF 8 PART 5 SEC VII OR ALSO SEE REF 6 NOTE THAT THE AVERAGE SLOPE OF FACILITY IS 1 TO 5 TO THE SOUTH. THE ABOVE INFORMATION IS NOT EASILY OBVIOUS ON THE TOPS BECAUSE OF THE QUADRANGLE'S AGE (1969) AND THE LACK OF A SUBSEQUENT PHOTO REVISION. REF 6*

Is the facility located either totally or partially in surface water? *NO. HOWEVER, AS STATED IN THE GENERAL DESCRIPTION, THE FACILITY IS A FORMER SWAMPY AREA THAT WAS EXCAVATED AND FILLED IN. REF 8 PART 5 SEC VI*

Russell
2/4/86

Is the facility completely surrounded by areas of higher elevation?

No. REF 6

1-Year 24-Hour Rainfall in Inches

$2\frac{1}{4}"$ REF 2 (47FR 31233)
ELKHART IS SITUATED BETWEEN THE $2"$ AND $2\frac{1}{2}"$ 1-YEAR
24 HOUR RAINFALL RANGE $2" + 2\frac{1}{2}" = 4\frac{1}{2}"$ $4\frac{1}{2}" \div 2 = 2\frac{1}{4}"$

Distance to Nearest Downslope Surface Water

SEE ALSO ATTACHED PAGE 7A

The distance from the site following the most likely path of water flow to the nearest downslope surface water that is not intermittent is 4876 ft or .92 miles (Ref 6) Zfy

Physical State of Waste

SOLID REF 9 P. 1

Mr. Himes stated that only solids were accepted at his landfill (Ref 9 p1) Mr. Bruce Carter of Miles Laboratories stated that liquids and solids were sent to Himco but no specific reference of a hazardous liquid was available. (Ref 9 p2) Zfy

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated: LANDFILL WITH SAND COVER AND VISIBLE LEACHATE STREAMS, REF 9 P. 1 AND P. 2., REF 8.

Method with highest score: LANDFILL IS NOT ADEQUATELY COVERED AND LEACHATE STREAMS VISIBLE. SITE PHOTOGRAPHS TAKEN DURING THE EDE SITE INSPECTION (REF. 8) SHOW THAT A SOUND DIVERSION SYSTEM DOES NOT EXIST. THE ABOVE PHOTOS ARE AVAILABLE FOR VIEWING IN THE EDE (CHICAGO OFFICE FILES REF 9 P. 1 AND P. 2. THIS PLACES THE SITE BETWEEN A MATRIX VALUE OF 1 (INADEQUATELY COVERED) AND 3 (NO DIVERSION SYSTEM PRESENT). I ASSIGNED THE SITE A VALUE OF 2 TO REFLECT THIS STATUS REF 2 (47FR 31236)

Russell
2/4/86

J. Russell

2/4/86

Page 7A

Distance to Nearest Surface Water

Specific records of exact locations of buried waste on the Himco Site are not available. As waste was brought in, the marshy land was filled in; then covered. At the center of the site the elevation is built up 15 ft and along the perimeter it is 5 ft higher than the original ground level. (Ref 3 p 5) This would indicate that waste may have been deposited all over the total 40 acres. Many areas of stressed vegetation exist on site (Ref 9 p 2, Ref 8 p 18-2). Leachate accumulations (Calcium sulfate) were observed scattered throughout the site. (Ref 9 p 2) Calcium sulfate was also observed on top of the site at the north end (Ref 9 p 2). Methane & sulfate odors were also observed throughout the site. (Ref 9 p 2) All these observations support that waste has been buried in several locations all over the site. Since exact waste pockets cannot be identified, distance to surface water will be measured from the center of the site rather than the site perimeter.

Measuring from the center of the site to the ditch at the northwest corner, thru the wetland into Manning ditch south to Osborne Creek to where it empties into the St. Joseph River is 6.875 (6 ⁷/₈) inches. This equals 13750 ft.
2.60 miles (Ref 6)

The distance to Osborne Creek where it is not intermittent is 2 ⁷/₁₆ inches. This equals 4876 or .92 miles (Ref 6)

Kathleen & Peter

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated COBAL WAS FOUND IN DOWNGRADIENT GROUND WATER SAMPLES. SEE GROUND WATER ROUTE - WASTE CHARACTERISTICS. REF #1

Barium, Arsenic & Cadmium also found downgradient with Matrix score of 18

Compound with highest score: TOXICITY PERSISTENCE MATRIX VAL

COBAL	1 (REF 12, P. 509)	3	REF 2 (47FR 31229)	12
Barium	3 (REF 12, P 398)	3	"	18
RAIM Arsenic	3 (REF 12, P 388)	3	"	18
Cadmium	3 (REF 12, P 456)	3	"	18

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

UNKNOWN. ASSUME 1 REF # 2 (47FR 31236) AND REF 15 P 3.

Basis of estimating and/or computing waste quantity:

SEE GROUND WATER HAZARDOUS WASTE QUANTITY SECTION

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance: Please see page 7A of this documentation package

Measuring from the center of the site to the ditch at the northwest corner of the site, through the adjacent wetland to Manning Ditch (which drains the wetland) then measuring Manning Ditch south into Osborne Creek which empties into St. Joseph River is a total of ~ 2.60 miles (Ref 6) The use of the St. Joseph River is recreation (Ref 10, 14, 23)

Drumell
2/4/82

Is there tidal influence?

NO.

REF 6

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

N/A

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

A marshy area is located to the immediate northwest of the site. It is approximately 1000ft from the site and roughly square in shape with ~1500ft sides $(1500ft)^2 = 2250000 ft^2 \div 43560 ft^2/acre = 51.65 acres$. Ref 6.

Surface runoff can reach this wetland (even though Ref 6 shows the site and the wetland at the same elevation) since the land fill it was built up ~15ft higher than the original level of the wetland. Ref 3 page 5.

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

UNKNOWN, BUT THE INDIANA BAT MAY BE PRESENT IN THE GENERAL AREA. REF 11.

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

NONE. ALL RESIDENTS IN 3 MILE DOWNSTREAM AREA ARE ON GROUND WATER. REF 4

J Russell
2/4/86

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

NONE REF 14

Total population served: 0. NO SURFACE WATER
INTAKES EXIST WITHIN 3 MILES DOWNSTREAM OF
SITE. REF 6 AND REF 4.

Name/description of nearest of above water bodies:

N/A

Distance to above-cited intakes, measured in stream miles.

N/A

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2/4/86

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected: *NONE*

Date and location of detection of contaminants

N/A

Methods used to detect the contaminants:

N/A

Rationale for attributing the contaminants to the site:

N/A

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

N/A

Most incompatible pair of compounds:

N/A

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2/4/86

FIRE AND EXPLOSION

1 CONTAINMENT

Hazardous substances present: A CERTIFIED DOCUMENT FROM THE STATE OR LOCAL FIRE MARSHAL STATING THAT A SIGNIFICANT FIRE HAZARD OR EXPLOSION THREAT EXISTS AT THIS SITE DOES NOT EXIST. DOCUMENTATION IN THE EYE HAS FOLDER DOES NOT INDICATE THAT SUCH HAZARDS ARE LIKELY TO EXIST AT THIS SITE.

Type of containment, if applicable:

N/A

2 WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

N/A

Ignitability

Compound used:

N/A

Reactivity

Most reactive compound:

N/A

Incompatibility

Most incompatible pair of compounds:

N/A

J Russell
2/4/86

DIRECT CONTACT

No Direct Contact Threat indicated.

1 OBSERVED INCIDENT

Kfy

Date, location, and pertinent details of incident:

* * *

2 ACCESSIBILITY

Describe type of barrier(s):

* * *

3 CONTAINMENT

Type of containment, if applicable:

* * *

4 WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

Compound with highest score:

* * *

S Russell
2/4/56

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

Well D-1
up-gradient

84MA68545
EPA Sample No.
ME 3201

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL

CASE NO. 3104

QC REPORT NO. 5471

Matrix WATER

Elements Identified and Measured

(ug/L) or mg/kg (Circle One)

RECEIVED SEP 27 1988

1. Aluminum <u>12,500</u> (P)	13. Magnesium NR (P)
2. Antimony <u><20</u> (F)	14. Manganese <u>1630</u> (P)
3. Arsenic <u>26</u> (F)	15. Mercury <u>0.21</u> (P)
4. Barium <u>121</u> (P)	16. Nickel <u>103</u> (P)
5. Beryllium <u><5</u> (P)	17. Potassium NR (P)
6. Cadmium <u><1</u> (P or <u>(F)</u>)	18. Selenium <u><2</u> (F)
7. Calcium NR (P)	19. Silver <u><10</u> (P)
8. Chromium <u>370</u> (P)	20. Sodium NR (P)
9. Cobalt <u><50</u> (P)	21. Thallium <u><10</u> (F)
10. Copper <u>73</u> (P)	22. Tin <u><20</u> (P)
11. Iron <u>67,400</u> (P)	23. Vanadium <u><200</u> (P)
12. Lead <u>73</u> (<u>(P)</u> or F)	24. Zinc <u>164</u> (P)
Cyanide <u><10</u>	Percent Solids NR

Footnotes: For reporting results to EPA, standard result qualifiers are used defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: _____

Well E-2
down-gradient

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

84MA08549

EPA Sample No.

ME 3205

Date _____

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL

CASE NO. 3104

LAB SAMPLE ID. NO. _____

QC REPORT NO. 5475

Matrix Water

Elements Identified and Measured

(ug/L) or mg/kg (Circle One)

RECEIVED SEP 27 198

1. Aluminum <u>350000</u> (P)	13. Magnesium <u>NR</u>
2. Antimony <u><20</u> (F)	14. Manganese <u>2150</u> (C)
3. Arsenic <u>200</u> (F)	15. Mercury <u>1.4</u> (C)
4. Barium <u>803</u> (P)	16. Nickel <u>422</u> (C)
5. Beryllium <u>11</u> (P)	17. Potassium <u>NR</u>
6. Cadmium <u>10</u> (P) or (F)	18. Selenium <u>14</u> (C)
7. Calcium <u>NR</u>	19. Silver <u><10</u> (C)
8. Chromium <u>461</u> (P)	20. Sodium <u>NR</u>
9. Cobalt <u>132</u> (P)	21. Thallium <u><10</u> (C)
10. Copper <u>555</u> (P)	22. Tin <u><20</u> (C)
11. Iron <u>146000</u> (P)	23. Vanadium <u>326</u> (C)
12. Lead <u>401</u> (P) or (F)	24. Zinc <u>1630</u>
Cyanide <u><10</u>	Percent Solids <u>NR</u>

Footnotes: For reporting results to EPA, standard result qualifiers are defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explained and contained on Cover Page, however.

Comments: _____

Well P
on site

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

84MA08546

EPA Sample No.

ME3202

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL

CASE NO. 3104

QC REPORT NO. 5471

Elements Identified and Measured

Matrix WATER

mg/L or mg/kg (Circle One) RECEIVED SEP 27 1984

1. Aluminum	175	(P)	13. Magnesium	NR	(P)
2. Antimony	<20	(F)	14. Manganese	182	(P)
3. Arsenic	26	(F)	15. Mercury	<0.2	(P)
4. Barium	97	(P)	16. Nickel	<40	(P)
5. Beryllium	<5	(P)	17. Potassium	NR	(P)
6. Cadmium	<1	(P or (F))	18. Selenium	4.7	(F)
7. Calcium	NR	(P)	19. Silver	<10	(P)
8. Chromium	<10	(P)	20. Sodium	NR	(P)
9. Cobalt	<50	(P)	21. Thallium	<10	(F)
10. Copper	<50	(P)	22. Tin	<20	(P)
11. Iron	11400	(P)	23. Vanadium	<200	(P)
12. Lead	6.7	(P or (F))	24. Zinc	58	(P)
Cyanide	<10		Percent Solids	NR	

Footnotes: For reporting results to EPA, standard result qualifiers are used defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explained and contained on Cover Page, however.

Comments:

Well M
onsite

84MA08547

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

EPA Sample No.
ME 3203

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL

CASE NO. 3104

QC REPORT NO. 5475

RECEIVED 5727 1984

Matrix Water

Elements Identified and Measured

ug/L or mg/kg (Circle One)

1. Aluminum	296	(P)	13. Magnesium	NR	(P)
2. Antimony	<20	(F)	14. Manganese	331	(P)
3. Arsenic	<10	(F)	15. Mercury	<0.2	(P)
4. Barium	172	(P)	16. Nickel	<40	(P)
5. Beryllium	<5	(P)	17. Potassium	NR	(P)
6. Cadmium	<1	(P or <u>F</u>)	18. Selenium	<2	(F)
7. Calcium	NR	(P)	19. Silver	<10	(P)
8. Chromium	16	(P)	20. Sodium	NR	(P)
9. Cobalt	<50	(P)	21. Thallium	<10	(F)
10. Copper	<50	(P)	22. Tin	<20	(P) B
11. Iron	12300	(P)	23. Vanadium	<200	(P)
12. Lead	7.7	(P or <u>F</u>)	24. Zinc	224	(P)
Cyanide	<10		Percent Solids	NR	

Footnotes: For reporting results to EPA, standard result qualifiers are use defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explic and contained on Cover Page, however.

Comments: _____

EXECUTIVE SUMMARY

EPA ID# 980607733
IND980500292 - CORRECT

Original Company Name: Himco Dump

Revised Company Name: _____

Alias Names: NO NAME (IND 980607733)

Original ☒ Address: County Rd. 10 and Nappanee Extension

Corrected _____ Elkhart, IN 46514

Elkhart County

☒ Landfill _____ Generator _____ Treatment, Storage, Disposal (TSD)

_____ Transporter _____ Other: _____

PRIORITY ASSESSMENT:

_____ HIGH ☒ MEDIUM _____ LOW _____ NO FURTHER ACTION (NONE)

CLASS:

_____ I-STATE LEAD ☒ II-REM/FIT LEAD _____ III-REM/FIT LEAD _____ IV OTHER:
State Accompanies No on-site State
FIT Involvement

State Priority Assessment Justification: Due to the poorly suited location of the landfill, above an unconfined aquifer and because of the large population of the area, a Site Inspection is warranted. This is an abandoned and unpermitted landfill and there has been a history of complaints about well water contamination and the landfill is probably the source.

State Comments Re: PA ☒ SI _____ Follow-up SI _____ RPS _____ HRS
The Site Inspection should include water and soil samples [up and down gradient and background]. There is also the possibility of groundwater monitoring wells being installed by Himco.

STATE INVOLVEMENT

COMPLETE DOCUMENTS:

☒ Preliminary Assessments
_____ Site Inspection
_____ Follow-up Site Inspection
_____ Responsible Party Search
_____ Hazard Ranking System (HRS)

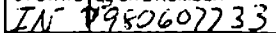
REVIEW DOCUMENTS:

_____ Preliminary Assessments
☒ Site Inspection
☒ Follow-up Site Inspection
☒ Responsible Party Search
☒ Hazard Ranking Sysytem (HRS)

Prepared by: Michael Dalton

Phone: (317)633-0158 Date: 2-14-84

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT PART 1 - SITE INFORMATION AND ASSESSMENT		I. IDENTIFICATION 01 STATE <u>IN</u> 02 SITE NUMBER <u>607733</u> <u>IND980500242</u>	
II. SITE NAME AND LOCATION			
01 SITE NAME (Legal, common, or descriptive name of site) <u>Himco Dump</u>		02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER <u>Co. Rd. 10 and Napanee Extension</u>	
03 CITY <u>Elkhart</u>	04 STATE <u>IN</u>	05 ZIP CODE <u>46514</u>	06 COUNTY <u>Elkhart</u>
07 COUNTY CODE <u>39</u>		08 CONG DIST <u>3</u>	
09 COORDINATES LATITUDE <u>41° 42' 30.0" N</u>		LONGITUDE <u>86° 00' 25.0" W</u>	
10 DIRECTIONS TO SITE (Starting from nearest public road) <u>Northwest corner of intersection of Co. Rd. 10 & Napanee Extension</u>			
III. RESPONSIBLE PARTIES			
01 OWNER (If known) <u>Charles Himes</u>		02 STREET (Business, mailing, residential) <u>707 Wildwood Ave</u>	
03 CITY <u>Elkhart</u>	04 STATE <u>IN</u>	05 ZIP CODE <u>46514</u>	06 TELEPHONE NUMBER <u>(219) 293-8534</u>
07 OPERATOR (If known and different from owner)		08 STREET (Business, mailing, residential)	
09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER ()
13 TYPE OF OWNERSHIP (Check one) <input checked="" type="checkbox"/> A. PRIVATE <input type="checkbox"/> B. FEDERAL: _____ (Agency name) <input type="checkbox"/> C. STATE <input type="checkbox"/> D. COUNTY <input type="checkbox"/> E. MUNICIPAL <input type="checkbox"/> F. OTHER: _____ (Specify) <input type="checkbox"/> G. UNKNOWN			
14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply) <input type="checkbox"/> A. RCRA 3001 DATE RECEIVED: ____/____/____ <input checked="" type="checkbox"/> B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: <u>6.9.81</u> <input type="checkbox"/> C. NONE MONTH DAY YEAR MONTH DAY YEAR			
IV. CHARACTERIZATION OF POTENTIAL HAZARD			
01 ON SITE INSPECTION <input checked="" type="checkbox"/> YES DATE <u>1.11.79</u> MONTH DAY YEAR <input type="checkbox"/> NO		BY (Check all that apply) <input type="checkbox"/> A. EPA <input type="checkbox"/> B. EPA CONTRACTOR <input checked="" type="checkbox"/> C. STATE <input type="checkbox"/> D. OTHER CONTRACTOR <input type="checkbox"/> E. LOCAL HEALTH OFFICIAL <input type="checkbox"/> F. OTHER: _____ (Specify)	
02 SITE STATUS (Check one) <input type="checkbox"/> A. ACTIVE <input checked="" type="checkbox"/> B. INACTIVE <input type="checkbox"/> C. UNKNOWN		03 YEARS OF OPERATION <u>1960</u> <u>1976</u> <input type="checkbox"/> UNKNOWN BEGINNING YEAR ENDING YEAR	
04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED <u>present or alleged: (hospital and pharmaceutical waste)</u> <u>1) heavy metals: toxic, persistent, incompatible</u> <u>2) other inorganic: toxic</u>			
05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION <u>1) ground water + population, environment</u> <u>2) surface water: environment</u> <u>3) direct contact: population, environment</u>			
V. PRIORITY ASSESSMENT			
01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents) <input type="checkbox"/> A. HIGH (Inspection required promptly) <input checked="" type="checkbox"/> B. MEDIUM (Inspection required) <input type="checkbox"/> C. LOW (Inspect on time available basis) <input type="checkbox"/> D. NONE (No further action needed, complete current disposition form)			
VI. INFORMATION AVAILABLE FROM			
01 CONTACT <u>George Oliver</u> <u>205</u>		02 OF (Agency/Organization) <u>Indiana State Board of Health</u>	
04 PERSON RESPONSIBLE FOR ASSESSMENT <u>Michael Dalton</u>		05 AGENCY <u>Div. of head Pollution Control</u>	06 ORGANIZATION <u>Indiana State Board of Health</u>
07 TELEPHONE NUMBER <u>13171633-0158</u>		08 DATE <u>2.15.84</u> MONTH DAY YEAR	





POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT

II. HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE IN 02 SITE NUMBER IND 982607733

01 ☒ A GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED

15900+ 02 ☒ OBSERVED (DATE 4-73) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
The upper aquifer is contaminated in the immediate vicinity of the landfill. This was first observed in April 1973 and the landfill has been shown to be the probable source. This is an unconfined aquifer and due to the porosity of the area, there appears to be a good chance of contamination in the lower aquifer also.

01 ☒ B SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED

15900+ 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
Leachate has been detected in the past. This leachate is able to migrate from the site towards Osborn Ditch and from there towards the St Joseph River.

01 ☐ C CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED

N/A

02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ D FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED

N/A

02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☒ E DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED

See A. Groundwater Contamination and G. Drinking water contamination

02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☒ F CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED

50+ 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
Due to the nature of the landfill and the high permeability of the soil, the potential for contamination encompasses the area of the landfill and the plume of contamination.

01 ☒ G DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED

15900+ 02 ☒ OBSERVED (DATE 4-73) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
See A. Groundwater Contamination. There are several residential wells in the area immediately south of the landfill and the site is located near a highly populated area.

01 ☐ H WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED

N/A

02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☒ I POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED

15900+ 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
See A. Groundwater Contamination and G. Drinking Water Contamination



POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
IN IND980607733

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☒ J. DAMAGE TO FLORA
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

Unknown

01 ☒ K. DAMAGE TO FAUNA
04 NARRATIVE DESCRIPTION (include name(s) of species)

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

Unknown

01 ☒ L. CONTAMINATION OF FOOD CHAIN
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

The potential exists due to NO_3^- accumulation in the upper aquifer

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES
(Spills/runoff, standing liquids/leaking drums)

02 ☒ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: 15,900+

04 NARRATIVE DESCRIPTION

This site was unsuited as a landfill site due to the poor geology of the area

01 ☒ N. DAMAGE TO OFFSITE PROPERTY
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

See A. Groundwater contamination and G. Drinking water contamination

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

N/A

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

This was an unpermitted dumping site

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

The water quality in the area is suspect the concentration of Fe and Mn is higher than the drinking water standards allow, and in some wells, the pH is higher than the background levels.

III. TOTAL POPULATION POTENTIALLY AFFECTED: 15,900+

IV. COMMENTS

Because of the unconfined aquifer and the large population in the area, a Site Inspection is warranted. This should include water and soil samples (background and also up and down gradient). There is also the possibility of monitoring wells being installed by industry.

V. SOURCES OF INFORMATION (Cite specific references, e. g., state files, sample analysis, reports)

Indiana State Board of Health files, conversations with staff of ISBH, USGS WRI81-53 "Hydrologic and Chemical Evaluation of the Groundwater Resources of Northwest Elkhart Co, Indiana."

STATE OF INDIANA
OFFICE OF THE SECRETARY OF STATE

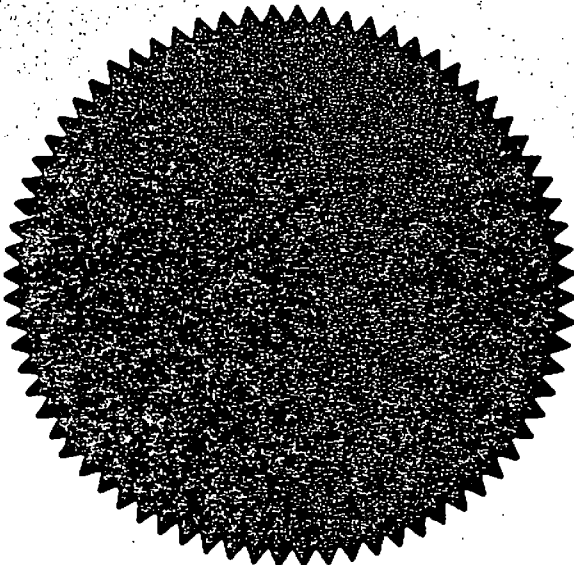
CERTIFICATE OF INCORPORATION
OF

..... EARTHMOVERS, INC.
.....

I, LARRY A. CONRAD, *Secretary of State of the State of Indiana*, hereby certify that Articles of Incorporation of the above Corporation, in the form prescribed by my office, prepared and signed in duplicate by the incorporator(s), and acknowledged and verified by the same before a Notary Public, have been presented to me at my office accompanied by the fees prescribed by law; that I have found such Articles conform to law; that I have endorsed my approval upon the duplicate copies of such Articles; that all fees have been paid as required by law; that one copy of such Articles has been filed in my office; and that the remaining copy of such Articles bearing the endorsement of my approval and filing has been returned by me to the incorporator(s) or his (their) representatives; all as prescribed by the provisions of the INDIANA GENERAL CORPORATION ACT

....., as amended.

Wherefore, I hereby issue to such Corporation this Certificate of Incorporation, and further certify that its corporate existence has begun.



In Witness Whereof, I have hereunto set my hand and affixed
the seal of the State of Indiana, at the City of Indianapolis,
this 3rd day of
July 75
....., 19.....

.....
LARRY A. CONRAD, *Secretary of State*

By.....
Deputy

APPROVED

AND

FILED

JUL 3 1975



SECRETARY OF
STATE OF INDIANA

Corporate Form No. 101 (Jan. 1974)

Page One

ARTICLES OF INCORPORATION

ARTICLES OF INCORPORATION

OF

EARTHMOVERS, INC.

The undersigned incorporator or incorporators, desiring to form a corporation (hereinafter referred to as the "Corporation") pursuant to the provisions of the Indiana General Corporation Act, as amended (hereinafter referred to as the "Act"), execute the following Articles of Incorporation.

ARTICLE I

Name

The name of the Corporation is Earthmovers, Inc.

ARTICLE II

Purposes

The purposes for which the Corporation is formed are:

(a) To own, lease, operate and maintain a sanitary landfill and all related trash hauling and collecting businesses; either alone or in conjunction with others to buy, hold, own, improve, manage, operate as lessee or lessor, sell, convey and mortgage and to act as broker or agent for the seller or buyer of real estate and personal property of every kind, character, and description whatsoever and wheresoever situated, and any interest therein; and to engage in any activity permissible under the Indiana General Corporation Act, as amended from time to time.

(b) To acquire, by purchase, exchange or otherwise, all or any part of or any interest in the properties, business, assets, rights, and good will of any one or more persons, partnerships, associations, entities, or corporations heretofore or hereafter engaged in any business which the Corporation has the right to conduct; to pay for the same in

cash, in property, or in stocks, bonds, or other obligations of the Corporation; in connection therewith, to assume or guarantee such persons, partnerships, associations, entities, or corporations; to hold, operate, and conduct in any lawful manner the whole or any part of any business thus acquired; and to reorganize, liquidate, sell, or in any other lawful manner dispose of the whole or any part thereof.

(c) To enter into general or limited partnerships or joint ventures for carrying on any lawful business for which the Corporation is organized; to act as agent broker, or representative of others for any lawful business purpose.

(d) To purchase or otherwise acquire, own, hold, use, lease, mortgage, pledge, sell, convey, or otherwise dispose of any kind of property, whether real or personal, tangible or intangible.

(e) To enter into and make contracts for any lawful purpose.

(f) To make any guarantee respecting stocks, securities, indebtedness, interest, mortgages, contracts, leases, or other obligations; to borrow money; to issue promissory notes, bonds, debentures, and other evidences of indebtedness; to secure such evidences of indebtedness by mortgage, pledge, and/or hypothecation of any or all of the assets of the Corporation; to enter into indentures specifying the various terms and incidents of such evidences of indebtedness; and to do any and all other acts and things necessary to borrow money on the part of the Corporation.

(g) To apply for, obtain, register, purchase, lease, or otherwise acquire letters patent of the United States of America or any foreign country, patent rights, licenses, privileges, inventions, improvements, processes, copyrights, trademarks, and trade names; to grant licenses thereunder; and to sell, assign, lease, pledge, mortgage, transfer, or otherwise deal in or dispose of any such letters patent, patent rights, licenses, privileges, inventions, improvements, processes, copyrights, trademarks, and trade names.

(h) To purchase, take, receive or otherwise acquire, hold, own, sell, pledge, transfer, reissue, cancel, or otherwise dispose of its own capital stock to the extent of earned surplus and capital surplus, in the manner and to the extent now or hereafter permitted by the Indiana General Corporation Act as amended from time to time.

(i) To conduct its lawful business within this State and in other States, territories, and foreign countries; to qualify for admission to do business in other States, territories, and foreign countries; and to comply with the laws and regulations pertaining to the doing of business in such

other States, territories, and foreign countries as may be deemed desirable, expedient, and proper from time to time.

(j) The foregoing clauses shall be construed as and shall be powers as well as purposes, and they are intended to be and shall be regarded as powers and purposes independent of each other; the matters expressed in each of said clauses shall not, except as otherwise expressly provided herein, be in any way limited by reference to or inference from the terms of any other clause, nor shall the inclusion of any particular expression be deemed to imply the exclusion of any similar but unstated expression. The Corporation shall be authorized to exercise and enjoy all of the powers, rights, and privileges granted or conferred by the Indiana General Corporation Act as amended, from time to time to corporations organized thereunder or which may be granted or conferred by the laws of any State, territory, or foreign country in which the Corporation may from time to time be conducting its business and under which the Corporation may from time to time qualify. The enumeration of certain specific powers in these Articles is not in any way intended to be a limitation, restriction, exclusion, or waiver of any of the powers, rights, or privileges granted or conferred by said Act or laws as now or hereafter in force, provided, however, that nothing contained in these Articles shall be deemed to authorize or permit the Corporation to carry on any business, exercise any power, or do any act which the Corporation may not lawfully carry on, exercise, or do.

ARTICLE III

Period of Existence

The period during which the Corporation shall continue is perpetual.

ARTICLE IV

Resident Agent and Principal Office

Section 1. Resident Agent. The name and address of the Resident Agent in charge of the Corporation's principal office is Charles H. Himes, Jr., 707 Wildwood, Elkhart, Indiana 46514.

Section 2. Principal Office. The post office address of the Corporation is 707 Wildwood Avenue, Elkhart, Indiana 46514.

ARTICLE V

Shares

Section 1. Number. The total number of shares which the Corporation has authority to issue is One Thousand (1,000) shares consisting of -0- shares with the par value of \$-0- per share, and One Thousand (1,000) shares without par value.

Section 2. Terms. There shall be one class of Capital stock designated as Common stock. Each shareholder shall be entitled to one (1) vote for each share of common capital stock held in his name on the records of the Corporation on the date which is ten (10) days before the date on which shareholders are entitled to vote or consent to action by the shareholders.

ARTICLE VI

Requirements Prior to Doing Business

The Corporation will not commence business until consideration of the value of at least One Thousand Dollars (\$1,000.00) has been received for the issuance of shares.

ARTICLE VII

Director(s)

Section 1. Number of Directors. The initial Board of Directors is composed of Two (s) member(s). The number of directors may be from time to time fixed by the Bylaws of the Corporation at any number. In the absence of a Bylaw fixing the number of directors, the number shall be two (2).

Section 2. Names and Post Office Addresses of the Director(s). The name(s) and post office address(es) of the initial Board of Director(s) of the Corporation is (are):

<u>Name</u>	<u>Number and Street or Bldg.</u>	<u>City</u>	<u>State</u>	<u>Zip Code</u>
Charles H. Himes Jr.,	707 Wildwood Avenue	Elkhart	Indiana	46514
Stephen G. Himes	707 Wildwood Avenue	Elkhart	Indiana	46514

Section 3. Qualifications of Directors. (If Any). Directors need not be shareholders of the Corporation.

ARTICLE VIII

Incorporator(s)

The name(s) and address(es) of the incorporator(s) of the Corporation is (are):

<u>Name</u>	<u>Number and Street or Bldg</u>	<u>City</u>	<u>State</u>	<u>Zip Code</u>
Geoffrey K. Church	P. O. Box 971 121 West Franklin Street	Elkhart,	Indiana	46514

All of such incorporators are of lawful age.

ARTICLE IX

Provisions for Regulation of Business
and Conduct of Affairs of Corporation

(a) The Board of Directors of this Corporation shall have the power and is hereby authorized to fix and determine the price at which or the consideration for which the shares of Common Capital Stock Without Par Value of this Corporation may from time to time be issued.

(b) The Corporation shall have the power to carry on and conduct its business or any part thereof and to have one or more offices in the State of Indiana and in the various other states, territories, colonies, and dependencies of the United States, in the District of Columbia, and in all or any foreign countries.

(c) This Corporation reserves the right to alter, amend, change, or repeal any provisions contained in its Articles of Incorporation and in all amendments thereof in the manner now or hereafter prescribed by statute, and all rights granted to or conferred on the shareholders of this Corporation are granted and conferred subject to this reservation.

(d) The Corporation shall have the power to indemnify any Director or officer or former Director or officer of the Corporation or any person who may have served at its request as a director or officer of another corporation in which it owns shares of capital stock or of which it is a creditor against expenses actually and reasonably incurred by him in connection with the defense of any action, suit, or proceeding, civil or criminal, in which he is made a party by

reason of being or having been such Director or officer, except in relation to matters as to which he shall be adjudged in such action, suit, or proceeding to be liable for negligence or misconduct in the performance of duty, provided, however, that such indemnification shall not be deemed exclusive of any other rights to which those indemnified may be entitled under any provisions of the Articles of Incorporation, Bylaws, resolution, or other authorization heretofore or hereafter adopted, after notice, by a majority vote of all the voting shares then issued and outstanding at the time of adoption of said Articles, Bylaws, resolution, or other authorization.

(e) Any action required or permitted to be taken at any meeting of the Board of Directors or of any Committee thereof may be taken without a meeting if, prior to such action, a written consent thereto is signed by all members of the Board or of such Committee as the case may be and such written consent is filed with the minutes of proceedings of the Board of Directors or Committee.

(f) Any action required or permitted to be taken at any meeting of the shareholders or any class thereof may be taken without a meeting if, prior to such action, a written consent thereto is signed by all shareholders entitled to vote on such action and such written consent is filed with the minutes of the meetings of shareholders.

(g) Any ownership share in the corporation, any dividend, demand obligation, past due obligation, other claim against the corporation, or fund or property held by the corporation, in equity or at law, which share, dividend, demand, obligation, claim, fund or property has been unclaimed for a consecutive period of six (6) years, shall revert to and become the property of the Corporation. This provision shall be conclusively deemed to be a part of every agreement, transaction, and action or failure to act by the Corporation or any representative of the Corporation. The Secretary of the Corporation shall, within six (6) months from and after the date such reversion becomes effective, prepare, by and on behalf of the Corporation, a written claim against the Corporation for such share, dividend, demand, obligation, claim, fund, or property which has so reverted to the Corporation, but failure to make such written claim shall not affect such reversion.

(h) The Board of Directors of the Corporation shall have the authority and power, without the consent or vote of the shareholders, to adopt, make, alter, amend, or repeal the

Bylaws of the Corporation. All general provisions for the regulation of the business and management of the affairs of the Corporation shall be stated in the Bylaws.

(i) The Corporation shall have no corporate seal.

IN WITNESS WHEREOF, the undersigned, being the incorporator designated in Article VIII, executes these Articles of Incorporation and certifies to the truth of the facts herein stated this 11 day of June, 1975.

Geoffrey K Church
(Written Signature)

Geoffrey K. Church
(Printed Signature)

STATE OF INDIANA
SS:
COUNTY OF ELKHART

I, the undersigned, a Notary Public duly commissioned to take acknowledgments and administer oaths in the State of Indiana, certify that Geoffrey K. Church, being the incorporator referred to in Article VIII of the foregoing Articles of Incorporation, personally appeared before me; acknowledged the execution thereof; and swore to the truth of the facts therein stated.

WITNESS my hand and Notarial Seal this 11th day of June, 1975.

Lynne Shaw
(Written Signature)

Lynne Shaw
(Printed Signature)

Notary Public

My Commission expires:

September 13, 1978

This instrument was prepared by the law firm of Church, Meteiver, Warrick & Weaver, Attorneys at Law, 121 West Franklin Street, P.O. Box 971, Elkhart, Indiana, 46514.

CONSENT TO USE OF
CORPORATE NAME

We, the undersigned President and Secretary of Earthmovers, Inc., an Indiana corporation, 233 Gladstone Avenue, Columbus, Indiana, acting for and on behalf of the corporation, do hereby consent to the use of the corporate name, Earthmovers, Inc., for a corporation to be organized under the provisions of the Indiana General Corporation Act, as amended, and whose principal office will be in Elkhart County, Indiana.

EARTHMOVERS, INC.

By *W. J. Palata*, President

Attest:

By *W. J. Palata*, Secretary

STATE OF INDIANA)

COUNTY OF Bartholomew)

SS:

Subscribed and sworn to before me this 28 day of
June, 1975.

Azora A. Gater, Notary Public
Azora A. Gater

My Commission Expires: 5/9/78



STATE OF INDIANA
Office of the Secretary of State

I hereby certify that this is a true and complete copy of the
_____ page document(s)
as filed in this office.

DATED July 29, 1988
E. B. J.

Secretary of State

BY Maureen A. Jeffers
This Certification Stamp replaces our previous Certification
System.

Earl W. Yeagley, Jr.
Associate General Counsel
and Assistant Secretary
Miles Laboratories, Inc.
Elkhart, Indiana
219-264-8395

December 9, 1974

Mr. Roland Dove
Stream Pollution Control Board
1331 West Michigan Street
Indianapolis, Indiana

Re: Himco Waste-A-Way Service, Inc.

Dear Mr. Dove:

Miles Laboratories, Inc., an Indiana, corporation located at 1127 Myrtle Street, Elkhart, Indiana joins in the request of Himco Waste-A-Way Service, Inc., for an extension of time to December 31, 1975, within which to discontinue its existing sanitary landfill at County Road 10 in Elkhart County, Indiana.

There are a number of facts and circumstances respecting this matter which, we believe, will demonstrate that the continued, and proper, operation of this landfill for an interim period of up to an additional year is in the best interests of the Elkhart community, including Miles Laboratories, and will not pose any potential threat to the health or environment in the area.

There are only two landfill operators of any significant capacity in the Elkhart community. Those are the Elkhart County and Himco landfills. Of the two, Himco handles a substantially greater volume of waste than does the County. Quite naturally, the County does not have excess or surplus equipment standing idly by to handle a sudden surge in demand. We have been advised by the Superintendent of the County landfill that, if he were to attempt to handle the additional volume now

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disposed of at the Himco fill, six (6) months would be required to procure the necessary equipment and to attain the capability to do so. We are further advised that the main County fill site presently has only about two (2) years of remaining capacity at its existing site. A vast increase in its inflow obviously would force the County to use up its capacity and move to another site at a much earlier date than presently anticipated.

Quite apart from those limitations, there are other limitations respecting hours of operation of the County landfill that would inflict an impossible burden on various industrial operators, particularly Miles, if they were to attempt to conform to those hours. The County landfill is open only five (5) days a week and its hours are 8:00 A.M. to 5:00 P.M. (We are advised that these restricted hours were agreed to by the County in connection with settlement of litigation by neighbors who had opposed the initial location of the landfill in their neighborhood.)

Miles, which employs approximately 2,500 employees in Elkhart, operates seven (7) days a week, 24 hours a day. Miles is the world's second largest producer of citric acid. Citric acid is utilized world wide, is an important food ingredient, and is used very heavily in the pharmaceutical industry. Calcium Sulphate is a by-product resulting from the process of manufacturing citric acid. As such, the calcium sulphate must be disposed of continually, as a part of the continuous operations of the citric acid plant. It normally is, and at the present time is, produced in the amount of 20 tubs, or 320 cubic yards, per day.

The physical design of the Miles plant provides a carousel arrangement of nine (9) rotating tubs, each with a capacity of 16 cubic yards. Thus, it is apparent that the maximum time required to fill all tubs, without having disposal service, is only about ten (10) hours. Miles must have both continuous availability of a place to dispose of the calcium sulphate

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and haul-away service available for at least 14 hours each day, all seven (7) days of the week. Thus, you will appreciate that, for Miles, the County landfill - with hours of only 8 to 5, five (5) days a week - simply is not a viable alternative, consistent with keeping its citric acid plant in operation.

It is quite important, of course, to recognize the characteristics of calcium sulphate. Calcium sulphate occurs, commonly, in nature. The "White Cliffs of Dover" are a form of calcium sulphate, as are large dunes in Texas and New Mexico, gypsum and many other things. The calcium sulphate produced by Miles is non-toxic and inert.

We note that SPCB Regulation 18 provides that "disposal sites and operations which receive only rocks, brick, concrete or earth," are excluded from the provision of that Regulation and, further, that other substances may be recognized also to be inert, under that Regulation. We request that calcium sulphate produced by Miles be so recognized and classified under the Regulations. In support thereof, we attach documents showing: I. The various forms of calcium sulphate; II. Common definitions; III. Occurrences and properties; IV. Uses; V. The National Formulary specifications for food grade materials; VI. Chemical analysis and; VII. Leaching studies on calcium sulphate.

This data will, we believe, demonstrate that the calcium sulphate should be recognized as inert and, further, that the very substantial volume of calcium sulphate is both an acceptable and desirable addition to the wastes in the Himco landfill.

As you know, the overwhelming majority of the wastes received by Himco consists of lumber, sawdust and other wastes from industrial and commercial enterprises.

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The operation has been highly responsible; there are no vectors or odors evident; and the premises are orderly. Mr. Himes, with the support of Miles, has responded well to legitimate concerns of the area in the past and we know of no present community criticism of his operations. While it may be recognized that this site might not be chosen for a new general purpose landfill using present day standards, it is a fact that this landfill has been in operation for fourteen (14) years. It is also pertinent that there is only about one year of capacity remaining at this landfill - at which time it must be discontinued in any event and a new site must be operable.

Mr. Himes has been endeavoring to acquire a new site for relocation of his landfill operations. Assuming that he succeeds in that endeavor within a reasonable time, he then must process the matter through local zoning procedures, accumulate the data for filing and processing a request for construction and operating permits through your office and accomplish the construction steps which are a pre-requisite to commencing operations at the new site. It would appear to be wholly realistic to anticipate that completion of these steps may, with all due diligence, reasonably consume all or most of a year's time.

We are confident that Himco can and will operate its landfill in a manner not detrimental to the Elkhart community. Permitting Himco's landfill to continue to operate until December 31, 1975 - while a replacement site is readied - will avoid the harsh and, we believe, unwarranted economic consequences that a closing would impose upon Himco, and upon Miles. We sincerely believe that the interests of Himco's many other industrial and local customers, and the interests of the entire community, would be substantially injured by a failure to allow time for an orderly transition, free of sharp disruptions.

Mr. Roland Dove

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You may be certain that Miles has a clear appreciation of the responsibilities and objectives of your office and would not request forbearance in this matter if it believed that any health hazard were imminent. Under the circumstances, it appears to Miles that the legitimate interests of your office and of Himco, Miles and the Elkhart community can all be reconciled and served by the continued and reasonable operations of the landfill for another year. We urgently request your approval of that course of action.

MILES LABORATORIES, INC.

By

Carl W. Yeagley Jr.

CALCIUM SULFATE

1. Forms

Combinations of calcium, sulfates, and water exist in several various forms: (1)

1. Anhydrous Calcium Sulfate (CaSO_4)

The natural form of anhydrous calcium sulfate is known as the mineral anhydrite (karstenite, muriacite, anhydrous sulfate of lime, anhydrous gypsum).

2. Insoluble anhydrite (dead-burned gypsum) (CaSO_4)

Has the same crystal structure as anhydrous calcium sulfate, but is obtained upon complete dehydration of gypsum at above.

3. Soluble anhydrite (CaSO_4)

Has the same crystal structure as anhydrous calcium sulfate, but is obtained by complete dehydration of gypsum at below 300°C in an electric oven.

4. Hemehydrate ($\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$) (dried calcium sulfate, plaster of paris, annelin, dried gypsum.)

Formed by the addition of 6.6% H_2O to the soluble anhydrite through absorption.

5. Dihydrate ($\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}$) (native calcium sulfate, precipitated calcium sulfate, gypsum, alabaster, selenite, terra alba, solenite, mineral white, satin spar, light spar.)

Calcium sulfate is said to be actually capable of existence in at least nine different forms - two forms of the dihydrate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$); three forms of the hemehydrate ($\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$); and four forms of the anhydrous salt (CaSO_4). (2)

II. Common Definitions

Websters Collegiate Dictionary: 5th Edition: Gypsum: Mineral. Hydrous calcium sulphate, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, 2. Sp. Gr., 2.31-2.32. Gypsum is used as a dressing for soils, for making plaster of paris, etc. -V.T. to treat with gypsum, as soil or water.

Food Chemicals Codex 1st Edition: Calcium Sulfate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$): a fine, white to slightly yellow-white, odorless powder. It is slightly soluble in water, but dissolves in dilute hydrochloric acid solutions.

The Condensed Chemical Dictionary - Fifth Edition

Terra alba $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ Finely pulverized powder made from gypsum and used in the manufacture of paper, paints, artificial marble, and composition plastics.

Gypsum $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. A natural hydrated calcium sulfate.

The National Formulary

Thirteen Edition - Calcium sulfate occurs as a fine, white to slightly yellow - white, odorless powder.

III. Occurrence, And Properties

Gypsum. This material properly defined, is the natural mineral of calcium sulfate dihydrate, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ -sp gr, 2.31-2.33; Mohs hardness, 1.5-2. It is widely and abundantly distributed in nature and occurs in an interesting variety of forms, conditions, associations, and colors. In pure form, gypsum is snow-white and occurs in stratified layers, doubtless of marine origin. Either because of varying conditions at the time of precipitation or through recrystallization, the mineral occurs in various conditions from hard, solid rock to fragmentary and granular forms. In some deposits the rock occurs in easily friable masses of coarsely crystalline beds, which are appropriately called "sugar rock." Many deposits yield the massive mineral through the body of which occur crystals of selenite (see below), these deposits being described as selenitic gypsum. Most deposits of gypsum occur closely associated with either strata or random occurrences of the mineral anhydrite, suggesting a question of the geological origin and the possible transformation of one form into the other after deposition.

Gypsum is widely distributed over the earth and is commercially available in quantity in most industrial nations. More than one-third of the states in the U.S. have abundant resources, as reported in the Minerals Yearbook.

The mineral occurs normally in horizontal strata or veins varying from a few inches to many feet in thickness. Open-pit or strip mining is employed for deposits near the surface; both slope and shaft mines are common for deeper deposits. The importance of the mineral gypsum as a source of almost all commercial forms of calcium sulfate is shown by the fact that in 1962 there were approximately 68 gypsum plants in the U.S., distributed through 22 states and operating 16 underground mines, 54 open quarries, and a number of mine-quarry combinations.

Gypsum dissolves in water to the maximum solubility of approximately 2.1 g/liter at about 40°C and has the lower solubility of approximately 1.8 at 0°C and 1.9 in the range of 70-90°C. The concentration varies erratically with traces of electrolytes and variations in pH and, preferably, should be determined experimentally for all systems other than pure water solutions.

Alabaster. This is massive, densely crystalline, softly textured form of practically pure gypsum. It is usually translucent and frequently tinted with beautifully variegated colors due, probably, in some cases, to optical effects in the crystalline mass and, in other cases, to traces of foreign materials. Several deposits in Colorado supply practically all of the alabaster used in the U.S. These deposits furnish the mineral in white and a variety of attractive color tints and blends. The mineral is taken from the mines with care in moderate to large lumps.

Alabaster, being relatively soft yet dense and fine-textured, is easily worked by the carving knife and the saw, and may be readily shaped by abrasive papers and polished to a fine smooth finish. Much of the shaping and finishing of alabaster is done while the stone is kept wet. Alabaster has been known and used for the carving of cruses, urns, and other small vessels, and for the making of images, statuary, and other art objects. Many ancient structures have been embellished by columns, porticoes, and other decorative finishes of alabaster.

Selenite. It is a pure form of gypsum crystallized in the monoclinic system in the form of sheets or plates that show a perfect and easy cleavage parallel to the plane of crystallization. Sheets or slabs of selenite occur in sizes up to several feet in width and length, and these sheets, with characteristic oblique corners, break down in parallelograms of similar proportions. Selenite crystals up to several inches in thickness are completely transparent. Thin sheets of selenite polarize light and are used in laboratory equipment for this purpose. Selenite does not have the elastic return of mica and, when once distorted, remains so.

Satin Spar. This is another form of pure crystalline gypsum and is known as gypsum var. satin spar (not to be confused with calcite var. satin spar, CaCO_3). The crystals are monoclinic and in the form of parallel threads. A mass of satin spar, therefore, resembles somewhat the common forms of asbestos and, in many cases, the threads can be picked or raveled out of the mass. In the more densely formed growths, satin spar is translucent and lends itself readily to fabrication and polishing into trinkets and small art objects. Satin spar is formed in seams, sutures, and faults in or near gypsum deposits by the precipitation from, or the evaporation of, ground water carrying the mineral in solution. It is, accordingly, sometimes called secondary gypsum. Formations of satin spar are frequently observed in abandoned mines and in the joints of masonry through which gypsiferous water reaches the open air.

Anhydrite. The natural mineral form of anhydrous calcium sulfate is known as anhydrite; it has a sp gr of approximately 2.8-2.9, and a Mohs hardness of 3-3.5. It is usually densely massive and frequently shows light tints of color as blue, pink, etc. Anhydrite has the same solubility in water as gypsum but does not react rapidly to form hydrates. It is, accordingly, less valuable as a raw material when this property is desired. It can be used as a sulfate source for ammonium sulfate.

Gypsite. This is an earthy deposit at or near the surface of the ground and consists of finely crystalline gypsum mixed with loams, clays, sands, and humus; it ranges from 60 to more than 90% gypsum. These deposits are formed by the movement of ground water carrying gypsum in solution and the deposit of the mineral by evaporation at the surface, or as windblown "losses" from disintegrating rock deposits. Surface beds or quarries of gypsite, chiefly in the southwestern states, have been worked in the production of plaster, structural tiles, etc., in the building industry but, in general, are at present of little commercial importance.

Gypsum Sands. Enormous deposits of practically pure gypsum in the form of fine, white sands occur at various points in Arizona, New Mexico, and Texas. These sands, covering many thousands of acres in some deposits, appear as drifts and dunes and are doubtless the result of evaporation of gypsum-bearing water rising to the surface of the earth through seepage springs or by uniform movement over wide areas of land. This is a natural result of the normal arid condition of the atmosphere in these regions. Practically without exception these deposits are contaminated with sodium sulfate to such an extent that they are valueless for structural or hydraulic purposes.(3)

IV. Uses

Gypsum, as such, has only a few major uses but these are important. In the manufacture of portland cement gypsum is a necessary ingredient and is used to lengthen the time of setting of various cements and mortars to allow for depositing and placing in forms. The "raw" gypsum is moved to the cement plants, usually in open cars, in the form of rock crushed to about 1.5 in. and finer. Automatic machines charge the crushed gypsum into the flow of cooled clinker in the amount of 3-5% as the mixture goes to the grinding mills.

In some foreign countries (as Germany), gypsum has been used as a source of lime, CaO , in the manufacture of portland cement. This involves the complete decomposition of the gypsum at the temperature of the cement kiln and then recovery of sulfur trioxide, SO_3 , as a by-product.

An important large-scale use of gypsum is in the treatment of soils, particularly those used for leguminous crops and in the culture of peanuts. For this use the gypsum (or occasionally anhydrite) is finely ground and is known as "land plaster." Benjamin Franklin is credited with the introduction into the U.S. of this application as the result of his observations in France. Finely ground gypsum, when mixed with manures, acts to stabilize the volatile and dissolved nitrogenous compounds, thus preventing their loss by volatilization and leaching. A major use in arid climates is neutralization of "black alkali" soil by reaction with the alkali carbonates that cause this condition.

As a stable, nontoxic, tasteless, odorless, nonabrasive, practically chemically inert powder, known as terra alba, gypsum is used in paints, pharmaceuticals, paper filling, insecticide dusts, yeast manufacture, water treatment, and many other industries. In brewing, it may be added to the water to lower the pH of the mash.

Some Recent Developments in the Use of Gypsum. Low-grade nickel ore is subjected to sulfide smelting by the addition of coal and gypsum in a continuous reverberatory furnace operated at 1300°C . The ore is crushed to 10 mm size.

Calcium sulfate and coke are heated in an electric furnace to give calcium carbide, carbon dioxide, carbon monoxide, and sulfur. The proportion of anhydrite to coke is 1.4:0.6.

Sulfuric acid is prepared by heating gypsum at 1200°C to produce sulfur trioxide. The required temperature can be lowered to 1000°C by the addition of quartz and the velocity increased by the addition of sodium chloride and moist air. A yield of 99% SO_3 is reported.

Ammonium sulfate is produced from calcium sulfate by reacting it with ammonia, carbon dioxide, and water. Calcium carbonate is produced as a by-product.

Gypsum is added to opal or transparent soda-lime or soda-potash-lime glasses as a coloring agent. The combined sulfur is reduced by elemental silicon or aluminum to produce colors varying from ivory to amber.

Porous polytetrafluoroethylene (Teflon) is made by mixing an aqueous dispersion of the polymer with plaster of Paris, pouring the mixture into a mold, and heating it until the polymer fuses. The plaster of Paris is then dissolved out, leaving a porous molded product.

For proper gel formation of certain food products a source of calcium ions is required. Calcium salts used for this purpose include calcium citrate, calcium gluconate, calcium glycerophosphate, calcium hypophosphite, di- and tricalcium phosphates, and calcium sulfate.

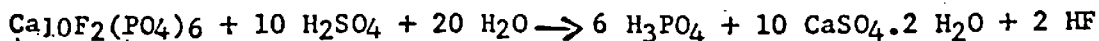
Water used in the brewing industry is often "corrected" to a uniform mineral salt content that corresponds to water known to give the most satisfactory final product. A wide variety of salts are used for this purpose, including mono- and diammonium phosphate, calcium chloride, calcium hydroxide, calcium oxide, calcium dihydrogen phosphate, calcium sulfate, magnesium sulfate, potassium aluminum sulfate, potassium chloride, potassium sulfate, sodium bisulfate and mono-, di-, and trisodium phosphate. Some of these chemicals, in addition to standardizing the salt content, also control the acidity, thus providing uniform conditions for yeast fermentation.

Three basic types of gypsum (calcium sulfate) derivatives provide the dental industry with the basis for a variety of useful materials. The versatility and usefulness of gypsum depend upon the ease, character, and reversibility with which the water of crystallization, and the attendant crystal form, can be altered. Fundamentally, a partial dehydration from the dihydrate form, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, to the hemihydrate form, $\text{CaSO}_4 \cdot 0.5\text{H}_2\text{O}$, of calcium sulfate is achieved by heating. The mode of applying the heat, and the conditions under which the partial dehydration occurs, alter the physical characteristics of the resulting crystal and provide the three basic types of gypsum derivatives (plaster; Hydrocal (United States Gypsum Co.); Densite (Certain-Teed Products Corp.); and low-consistency hydrocal). In use, the powdered calcium sulfate hemihydrate, $\text{CaSO}_4 \cdot 0.5\text{H}_2\text{O}$, which has been formulated into a useful product, is mixed with a prescribed quantity of water to form a slurry. The partially dehydrated calcium sulfate, $\text{CaSO}_4 \cdot 0.5\text{H}_2\text{O}$, will recombine with the mixing water, and recrystallize, to again form the dihydrate of calcium sulfate, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. The solution of the hemihydrate, followed by the recrystallization of the dihydrate, results in a crystalline growth which solidifies the entire mix into a structurally strong and useful mass.

The natural or unmodified hardening time for plaster of Paris is in the range of 5-120 min. However, this entire family of materials is subject to considerable modifications to adapt them for a variety of useful dental materials.

Many of the newer therapeutic agents are of extremely high potency, thereby requiring only fractions of a milligram per dose. In such cases, the tablet consists mainly of inert filler providing bulk so that a tablet of suitable size for ease of handling by the manufacturer, pharmacist, and patient can be manufactured. These fillers or excipients may be lactose, mannitol, sucrose, calcium sulfate, calcium phosphate, or microcrystalline cellulose. In addition, other agents such as binders (tragacanth, acacia, starch paste, methylcellulose, etc), disintegrants (corn starch alginic acid, microcrystalline cellulose), and lubricants (stearic acid, magnesium stearate, calcium stearate, Carbowax, and talcum) are usually added to the tablet formulation.

Production of phosphoric acid by the wet process involves the steps of (1) dissolving phosphate rock in sulfuric acid, (2) holding the acidulate slurry until the calcium sulfate crystals grow to adequate size, (3) separating the acid and calcium sulfate by filtration, and (4) concentrating the acid to the desired level. The reaction for the process used most extensively is as follows:



V. The National Formulary - Thirteenth Edition
Specifications For Food Grade Material

Calcium Sulfate is anhydrous or contains two molecules of water of hydration. When dried at 250° to constant weight, it contains not less than 99.0 percent and not more than 101.0 percent of CaSO_4 .

Description - Calcium Sulfate occurs as a fine, white to slightly yellow-white, odorless powder.

Solubility - Calcium Sulfate dissolves in diluted hydrochloric acid. It is slightly soluble in water.

Identification - Dissolve about 200 mg. of Calcium Sulfate by warming in a mixture of 4 ml. of diluted hydrochloric acid and 16 ml. of water. This solution responds to the tests for Calcium, and for Sulfate.

Loss on Drying - Dry Calcium Sulfate at 250° to constant weight: the anhydrous form loses not more than 1.5 percent of its weight; the dihydrate loses not less than 19 percent and not more than 23 percent of its weight.

Carbonate - Mix 1 g. of Calcium Sulfate with 5 ml. of water, and add a few drops of diluted hydrochloric acid: no effervescence occurs when the acid is added.

Iron - Dissolve 200 mg. of Calcium Sulfate and about 50 mg. of ammonium persulfate in 10 ml. of diluted hydrochloric acid, dilute to 50 ml. with water, and mix. To this solution add 3 ml. of ammonium thiocyanate T.S., and mix thoroughly: the color obtained is no darker than that produced in 50 ml. of a solution containing 140 mcg. of ferrous ammonium sulfate (equivalent to 20 mcg. of Fe) when treated in the same manner (100 parts per million of Fe).

Heavy metals - Mix 2 g. of Calcium Sulfate with 20 ml. of water, add 25 ml. of diluted hydrochloric acid, and heat to boiling to dissolve the sample. Cool, and add stronger ammonia water to a pH of 7. Filter, evaporate to a volume of about 25 ml., and refilter if necessary to obtain a clear solution: the heavy metals limit for Calcium Sulfate is 10 parts per million.

Assay - Dissolve about 300 mg. of Calcium Sulfate, previously dried at 250° to constant weight and accurately weighed, in 100 ml. of water and 4 ml. of diluted hydrochloric acid. While stirring, preferably with a magnetic stirrer, titrate as follows: add about 30 ml. of 0.05M disodium ethylenediaminetetraacetate from a 50-ml. buret, then add 15 ml. of sodium hydroxide T.S. and 300 mg. of hydroxy naphthol blue, and continue the titration to a blue endpoint. Each ml. of 0.05 M disodium ethylenediaminetetraacetate is equivalent to 6.807 mg. of CaSO_4 .

Packaging and storage - Preserve Calcium Sulfate in well-closed containers.

Labeling - The label should indicate whether the Calcium Sulfate is anhydrous or the dihydrate.

Food Chemicals Codex - First Edition
Specifications For Food Grade Material cont'd

$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

' Calcium Sulfate

Description - A fine, white to slightly yellow-white, odorless powder. It is slightly soluble in water, but dissolves in dilute hydrochloric acid solutions.

Identification - Dissolve about 200 mg. by warming with a mixture of 4 ml. of diluted hydrochloric acid T.S. and 16 ml. of water. A white precipitate

forms when 5 ml. of ammonium oxalate T.S. is added to 10 ml. of the solution. Upon the addition of barium chloride T.S. to the remaining 10 ml., a white precipitate forms which is insoluble in hydrochloric and nitric acids.

Specifications - Assay. Not less than 99 percent and not more than the equivalent of 105 percent of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$.

Limits of Impurities - Arsenic (as As). Not more than 3 parts per million (0.0003 percent).

Fluoride. Not more than 30 parts per million (0.003 percent).

Heavy Metals (as Pb). Not more than 10 parts per million (0.001 percent).

Selenium. Not more than 30 parts per million (0.003 percent).

TESTS

Assay. Dissolve about 350 mg., accurately weighed, in 100 ml. of water and 4 ml. of diluted hydrochloric acid T.S. While stirring, preferably with a magnetic stirrer, add about 30 ml. of 0.05 M di-sodium ethylenediaminetetraacetate from a 50-ml. buret, then add 15 ml. of sodium hydroxide T.S. and 300 mg. of hydroxy naphthol blue indicator, and continue the titration to a blue end-point. Each ml. of 0.05 M disodium ethylenediaminetetraacetate is equivalent to 8.609 mg. of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$.

Arsenic. Mix 1 gram with 10 ml. of water, add 12 ml. of diluted hydrochloric acid T.S., and heat to boiling to dissolve the sample. Cool, filter, and dilute the filtrate to 35 ml. with water. This solution meets the requirements of the Arsenic Test.

Fluoride. Weigh accurately 1.67 grams, and proceed as directed in the Fluoride Limit Test.

Heavy metals. Mix 2 grams with 20 ml. of water, add 25 ml. of diluted hydrochloric acid T.S., and heat to boiling to dissolve the sample. Cool, and add ammonium hydroxide to a pH of 7. Filter, evaporate to a volume of about 25 ml., and refilter if necessary to obtain a clear solution. This solution meets the requirements of the Heavy Metals Test, using 20 mcg. of lead ion (Pb) in the control (Solution A).

Selenium. A solution of 2 grams in 40 ml. of dilute hydrochloric acid (1 in 2) meets the requirements of the Selenium Limit Test.

Packaging and storage. Store in well-closed containers.

Functional use in foods. Nutrient supplement; yeast food; dough conditioner; firming agent.

VI. Typical Analysis

The process for converting wet Calcium Sulfate cake to Food Grade $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ is simply one of drying. The wet cake contains 24-29% free water. When dried, the typical analysis is as follows:

Description	White to off white powder
pH	4.5 @ 20°C
Iron	15.3 ppm
Heavy Metals	* LT 10 ppm
Fluoride	0.15 ppm
Selenium	Neg.
Assay	99.81%
Loss on Drying	19.7%
Identification	Passes Test
Arsenic	* LT 3 ppm
Carbonate	Neg.
Solubility	Passes Test

*Less than

REFERENCES:

Page 1, footnote (1):

Abstracted from The Merck Index - 8th Edition, Page 196, Pub. Merck & Co., Inc.
Rahway, N.J., U.S.A. 1968

Page 1, footnote (2):

K. K. Kelly, J. C. Southard, and C. T. Anderson, U. S. Beer Mines Tech. Papers,
625, 3 (1941)

Page 4, footnote (3):

Review: Hammond in Kirk-Othmer Encyclopedia of Chemical Technology, Vol. 4,
2nd Edition, Interscience, 1964.

November 20, 1974

LEACHING STUDIES ON CALCIUM SULFATE

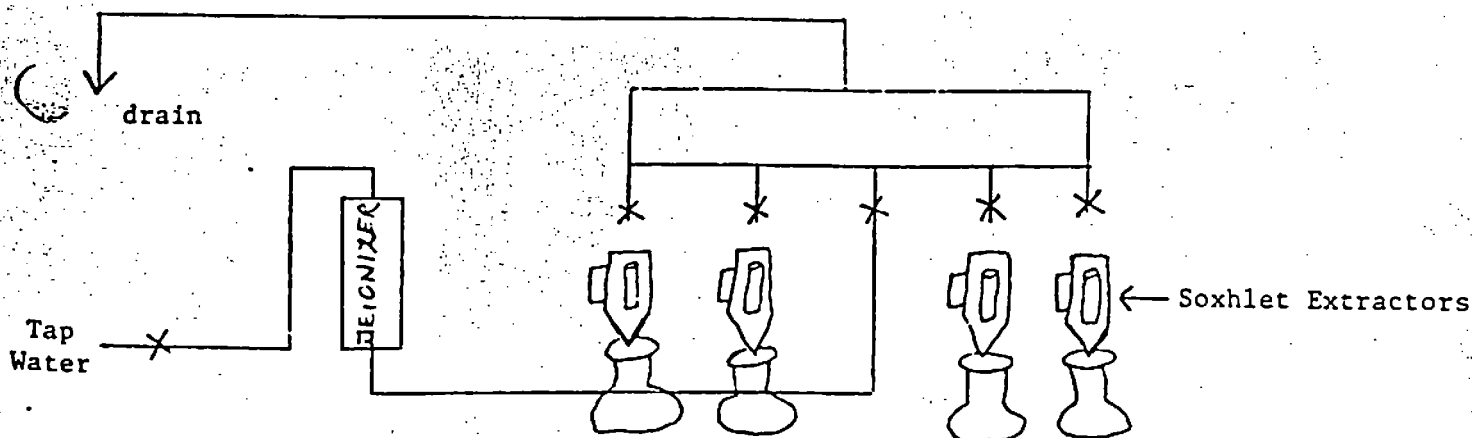
A leaching study was performed on both the wet calcium sulfate as it now is, and on repulped calcium sulfate, which will be representative of the calcium sulfate after March 1, 1975, at which time the calcium sulfate will be filtered then repulped in water and again filtered. Test design and results follow:

Test Design

Tap water was run through an IWT ion exchanger research model II available from Campbell Industrial Sales, P.O. Box 629, Carmel, Indiana. The deionizer fed a four spigot manifold with flow control valves at each spigot.

50 grams each of wet calcium sulfate cake, repulped calcium sulfate cake, and a control of local soil, were placed in separate Whatman Cellulose Extraction Thimbles - single thickness - 33 x 94 mm. An empty thimble was used in the fourth unit as a blank.

The deionized water was dripped into the thimbles at a rate of 200 ml/hour and collected for chemical analysis. Three 200 ml. extractions were collected for each sample. All cation results are by atomic absorption. The aliquot used was first concentrated by four, then acidified with HCl and analyzed. All other test procedures are explained with the data. All data is expressed - as is - in the 200 ml. segment collected. All extractions done at ambient temperatures, approximately 72°F.



I

	Wet Calcium Sulfate Cake		
Test	1st	2nd	3rd
Calcium ppm	625	585	575
Magnesium ppm	1.4	.08	.025
Sulfate ppm ⁽¹⁾	1504	1455	1306
Iron ppm	.4	LT.05	LT.05
Copper	.11	.07	.10
Zinc ppm	.10	.01	.02
Chromium ppm	LT.025	LT.025	LT.025
Aluminum ppm	LT.05	LT.05	LT.05
Silica ppm	1.5	.5	.5
Sodium	6.4	0.6	.43
Manganese ppm	0.9	LT.025	LT.025
Molybdenum ppm	LT.05	LT.05	LT.05
Potassium ppm	2.7	.27	.12
Chloride ⁽²⁾	LT.10	LT.10	LT.10
Total Dissolved Solids ⁽³⁾ ppm	1925	1983	1769
pH at 25°C	3.30	4.71	4.87
Total Acidity ⁽⁴⁾ Normal NaOH	$\frac{10 \text{ ml}}{100 \text{ ml}}$	$\frac{10 \text{ ml}}{100 \text{ ml}}$	$\frac{10 \text{ ml}}{100 \text{ ml}}$
Color O.D. ⁽⁵⁾	.05	.05	.05
Chloric Acid Content	LT.01%	LT.01%	LT.01%
Heavy Metal ⁽⁶⁾	LT3ppm	LT3ppm	LT3ppm

II

	Repulped Calcium Sulfate Cake		
Test	1st	2nd	3rd
Calcium ppm	683	330	284
Magnesium ppm	.065	.05	LT.02
Sulfate ppm	960	636	662
Iron ppm	.2	LT.05	LT.05
Copper	.12	.10	.07
Zinc ppm	.11	.02	.01
Chromium ppm	LT.025	LT.025	LT.025
Aluminum ppm	LT.05	LT.05	LT.05
Silica ppm	.9	.8	1.0
Sodium	4.4	.8	.42
Manganese ppm	.05	.04	LT.025
Molybdenum ppm	LT.05	LT.05	LT.05
Potassium ppm	1.7	.24	.05
Chloride	LT.10	LT.10	LT.10
Total Dissolved Solids ppm	1253	889	907
pH at 25°C	3.31	4.44	5.00
Total Acidity Normal NaOH	$\frac{10 \text{ ml}}{100 \text{ ml}}$	$\frac{10 \text{ ml}}{100 \text{ ml}}$	$\frac{10 \text{ ml}}{100 \text{ ml}}$
Color O.D.	.05	.05	.05
Chloric Acid Content	LT.01%	LT.01%	LT.01%
Heavy Metal	LT3ppm	LT3ppm	LT3ppm

III

	Elkhart Soil		
Test	1st	2nd	3rd
Calcium ppm	150	2.0	2.1
Magnesium ppm	1.2	1.0	.44
Sulfate ppm	20	10	LT.10
Iron ppm	3.7	2.2	1.0
Copper	.15	.11	.06
Zinc ppm	.06	.04	.01
Chromium ppm	LT.025	LT.025	LT.025
Aluminum ppm	1.2	.09	.25
Silica ppm	5.1	4.0	4.1
Sodium	22	4.4	0.4
Manganese ppm	.42	.11	.05
Molybdenum ppm	LT.05	LT.05	LT.05
Potassium ppm	2.4	1.2	.51
Chloride	LT.10	LT.10	LT.10
Total Dissolved Solids ppm	125	40	42
pH at 25°C	6.42	6.74	6.62
Total Acidity Normal NaOH	$\frac{6 \text{ ml}}{100 \text{ ml}}$	$\frac{10 \text{ ml}}{100 \text{ ml}}$	$\frac{9 \text{ ml}}{100 \text{ ml}}$
Color O.D.	2.30	0.65	0.45
Chloric Acid Content	LT.01%	LT.01%	LT.01%
Heavy Metal	LT3ppm	LT3ppm	LT3ppm

IV

	Deionized Water Used	
Test	1st	2nd
Calcium ppm	1.4	.23
Magnesium ppm	.22	.04
Sulfate ppm	neg	neg
Iron ppm	LT.05	LT.05
Copper	.1	.1
Zinc ppm	.02	.005
Chromium ppm	LT.025	LT.025
Aluminum ppm	.11	LT.05
Silica ppm	3	2.1
Sodium	1.2	.40
Manganese ppm	LT.025	LT.025
Molybdenum ppm	LT.05	LT.05
Potassium ppm	.12	.025
Chloride	neg	neg
Total Dissolved Solids ppm	0	0
pH at 25°C	4.60	4.60
Total Acidity Normal NaOH	$\frac{10 \text{ ml}}{100 \text{ ml}}$	$\frac{10 \text{ ml}}{100 \text{ ml}}$
Color O.D.	-	-
Chloric Acid Content	LT.01%	LT.01%
Heavy Metal	LT3ppm	LT3ppm

Abbreviations: LT = Less Than

ANALYTICAL PROCEDURES

1. Sulfate

50 mls. sample + 1 g. BaCl_2 . Filter through a weighed crucible with asbestos mat. Rinse with methyl alcohol, dry at 105°C for 2 hours.

Record weight gain as BaSO_4 .

$(\text{mg. BaSO}_4) \times 0.412 = \text{wt. SO}_4 \text{ 50 mls. in mgs.}$

$\text{wt. SO}_4 \text{ in 50 mls.} \times 20 = \text{ppm SO}_4$

2. Chloride

(Volhard Method) Standard Methods for the Examination of Water, Sewerage and Industrial Wastes, Tenth Edition, page 59.

3. Total Dissolved Solids

As above pg. 178 - Total Residue

4. Total Acidity

As above pg. 34

5. Color

Direct spectrophotometer reading at 420 mm vs. blank.

Lumetron used, 19 mm rounded curvette.

6. Heavy Metals - U.S.P. XIII